

THE IRON AGE

New York, Thursday, August 16, 1906.

The Electric Car Equipment of the Long Island Railroad.

BY W. N. SMITH.

The tendency of a change from steam to electric motive power on suburban lines, such as those of the Long Island Railroad, is to convert them into a rapid transit system of the same general type as the subway and elevated systems now operating in the largest cities. The multiple unit system of train operation is the best method for conveniently handling suburban trains, where, as in other rapid transit service, relatively frequent stops are necessary. The distribution of motive power through the train eliminates dead weight and utilizes the weight of the train to secure adhesion for the train propulsion, an advantage which becomes relatively more important as the interval between stops is shortened and the train is accelerated from rest more frequently.

The design of the car equipment of the Long Island

first all steel passenger cars ever built, and which were designed by George Gibbs for the New York Subway, led him in his capacity as chief engineer of the Long Island Railroad electric conversion to advocate their use on this road as well. They insure immunity from fire and are superior to wooden cars in strength and durability. The Long Island Railroad cars were built on much the same lines as those for the New York Subway. Except for the steps, made necessary for the low platforms at suburban stations, the bodies are practically identical. The multiple unit system of control removes the weight restriction imposed upon cars drawn and make it possible to construct the car more rigidly and able to resist shocks. However, the steel construction does not materially increase the weight over that of a durable wooden car, and the increased strength and durability are secured without sacrificing operating economy.

The principal dimensions of the steel cars are: Greatest length, 51 ft. 4 in.; greatest width, 9 ft. $\frac{1}{2}$ in., and greatest height, 12 ft. $\frac{3}{4}$ in. The steel trailer cars are of the same dimensions as the motor cars and may be

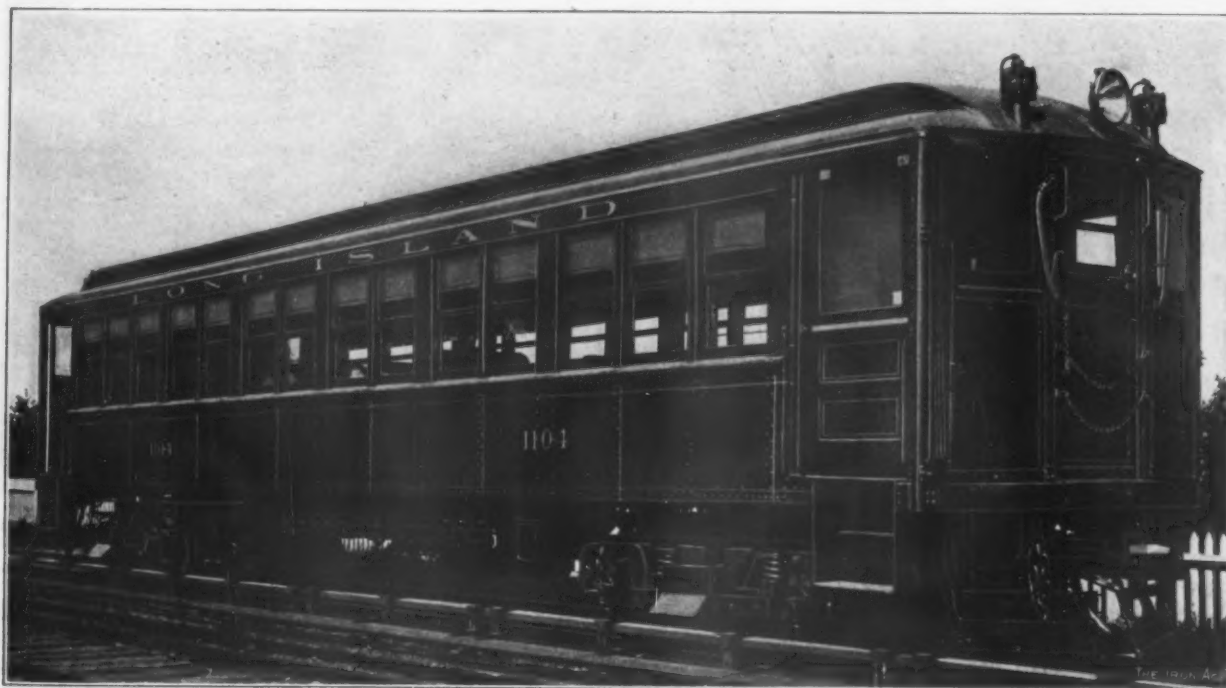


Fig. 1.—One of the Steel Motor Cars for the Long Island Railroad.

Railroad is based upon a careful study of the traffic conditions, calling for trains of from two to six cars at different hours of the day, in regular operation, while heavy excursion travel to the beaches and race tracks would occasionally require trains of 10 or 12 cars. Some of the service is express and some local. The schedule speed including stops called for was from 20 to 25 miles per hour for local trains and 25 to 30 $\frac{1}{2}$ miles per hour for express trains. The Brooklyn Rapid Transit trains, which will operate over parts of the Long Island lines, were to be mostly expresses. The maximum possible speed for express runs can be made when all the cars of a multiple unit train are motor cars, but usually a portion of each train may consist of trailers. A considerable saving in the weight of the entire train is thus possible without exceeding either the tractive power of the motors or their ability to radiate the heat developed by the frequent accelerations, which are the severest tax upon them.

The fact that part of the road is a subway and the need for interchangeability with the rolling stock of the Interborough Rapid Transit subway had much to do with the design of the cars. The complete success of the

readily converted into motor cars. While the car body closely conform to the conventional steam railroad coach, the use of steel is responsible for some differences in the framing, but most of the standard parts in wooden car framing have their counterparts in the steel car. The center sills are two heavy I beams, continuous between the platform end sills, and the side sills are heavy angles. Two extra sills, extending back to the body bolster and composed of angles, support the vestibule platforms. The bolsters are built up, the top and bottom members being two rolled steel plates, machined on their outer ends to fit together perfectly, the top member being bent down over the bottom member and bolted to it. In the space between the top and bottom members and between the center sills is placed a malleable iron draw casting, machined to fit between the bolster plates and the longitudinal sills, to which it is bolted. Between the center and side sills malleable iron struts are inserted. The body center plates are cast steel, machined to fit the truck center plates and the bottom member of the body bolster, and have their edges lipped over the bolster, to which they are secured by heavy bolts.

The floor framing and transference of the floor load to the side trusses of the car are different from the construction hitherto followed in wooden coaches. Needle beams and longitudinal underneath trussing are dispensed with, the construction being as follows:

The belt rail, side sills and side posts are riveted together at their intersections, making a truss of square panels so reinforced by the steel side sheathing of the car that they constitute a stiff truss without needing diagonal bracing. Instead of needle beams and longitudinal truss rods four sets of diagonal braces reach down from the side posts of the car below the belt rail and are fastened to the bottom framing. These braces are concealed in the backs of the stationary cross seats. The bottom chords of the four cross trusses are riveted to heavy steel castings which form struts between the two center sills, considerably increasing the stiffness of the bottom framing. The center sills are further stiffened by the draw castings for the draft gear and by the body end sill and platform end sill construction, and also by numerous cross bridges. The platform end sills are continuous heavy angles, bent to shape. The vestibule end posts are fastened to them with heavy steel castings. The end sills of the car body are not continuous across the ends, but comprise a double set of short angles fastened between the side and center sills by single iron braces, making a stiff

Van Dorn automatic type supported on a sector bar under the car platform, the radius bar being centered upon a pin set in a cast steel auxiliary bolster bolted to the center sills. Reaching from this pin to the body bolster, where it is fastened in a similar way, is a continuation of the radius bar, the construction being designed to form a knuckle in the radius bar, since it cannot be extended to the body bolster because of the 90-ft. radius curve around which the cars must run. At either side of the draw bar safety coupling chains are provided, fitted with springs and anchor forgings fastened to the antitelescoping plate under the platform end sill.

The roof framing of the car consists essentially of the car lines arching across the side plates, each a single bent angle reinforced by short angles at the bends, which constitute the deck posts. These reinforcing pieces support the deck sills and furring strips to which the head linings and roofing are fastened. The roof of the vestibule is supported on arched angle bows, which are riveted to the end bows and to the end carlines and are in duplicate on account of the peculiar construction of the body end post previously described.

The roof carlines are connected by purlines of light steel angles. The carlines are secured to malleable iron castings, which are riveted to the side plates, and the purlines are riveted to the former with small angle braces.

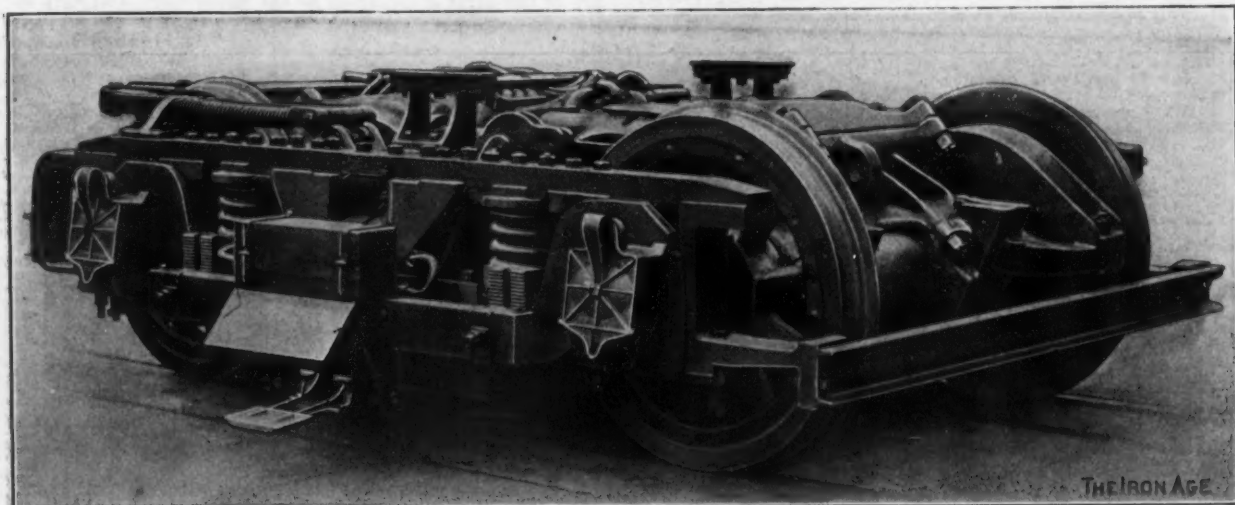


Fig. 2.—A Motor Car Truck.

construction for holding the side and center sills rigidly in line. They constitute a set of box framed struts, or filling in pieces, between the sills, at the ends of the car.

The body corner posts are also special. The corner post proper consists of an angle fastened to the end sill and the end plate, which is reinforced by a Z bar, and also by the first side post of the car, which is riveted to the side sill and the side plate. The first post and the end post are made practically one member by the side sheathing, which is riveted to the angles and tees constituting the post and is rounded similar to the outside of the ordinary post. Immediately toward the center of the car from this end post is the pocket for the sliding vestibule doors, and at right angles to this pocket is the one for the sliding end doors of the car body. There are 16 posts along each side of the car, of which six are compound, being made of two 3 x 2 x 1/4 in. angles.

To the top of the side posts are secured side plates of 4 1/2 x 3 in. angles, continued from end to end of the car vestibule hoods, where they are fastened to the end bows, which are of heavy angle bent to form the convex ends of the car vestibules. The end plates of the car body framing are heavy angles, in duplicate, on account of the door pocket, and are framed directly across above the level of the side plates, being connected to them by braces forming a sort of Z connection. This admits the rails for the sliding doors in the end of the car body, and also facilitates curving the roof, which is somewhat lower than usual on account of the tunnels on the road.

The draft gear comprises a spring draw bar of the

The carlines and purlines are faced with a furring of maple, secured by bolts, to which the roofing and head linings are fastened by wood screws. Maple blocks are also secured to the side plates and hood bows for the support of the roof covering and the head lining. The deck sills and deck plates are of maple, so that the roof and its lining can be readily put on with wood screws. A very light roof covering is used, consisting of composite board 3/4 in. thick, except over the vestibule, where it is No. 16 gauge sheet steel, the whole being covered with heavy canvas laid on with white lead.

The vestibules are of the Gibbs patent type with steel plate floors. The vestibule side doors slide, leaving the entire platform clear, and close against pneumatic cushions, so as to readily release the clothing of passengers if caught by the closing of the door. The device for operating the side doors consists of a series of bell cranks and levers, arranged either overhead or outside, leaving the entire interior of the vestibule clear. Side steps are provided, the gangway being fitted with trap doors of 3/16-in. sheet steel, to enable the use of the entire width of the vestibule when the side doors are closed. The vestibule end door, when in the extreme open position, incloses all the controlling apparatus. When this door is shut and the side door closed the entire vestibule is available as a motorman's compartment and the control apparatus is exposed.

The body end doors are of double sliding type and are fitted with a door coupling device to hold them in any position.

The side sheathing of the car is $\frac{1}{8}$ -in. steel plate and is overlapped by the bulb angles which form the belt rail and the window sills. The post covers between the windows are of special pressed steel, flanged out at their lower ends to fit over the belt rail, which runs the length of the body outside of the posts, while the top ends extend under the letterboard, which is a steel plate $7\frac{1}{16}$ in. wide, running the length of the car, riveted to the side plates. The covering of the car is waterproof because its parts overlap, avoiding cracks into which water can run by gravity. All joints between the side sheathing plates are covered with sheet metal battens.

The floor is corrugated sheet iron supported by the longitudinal sills, and the steel plate bridging between them and covered with Monolith plastic floor upon which the maple floor strips are laid. This monolithic floor is fireproof and is laid on in the form of a cement, which when set has a smooth, hard finish. The arrangement of the seats is similar to that in subway and elevated railroad cars generally. The seat frames are of steel carried upon brackets riveted to the side posts. The cushions and the seat backs are rattan. Each car will seat 52 persons. The wainscoting is of steel, backed by asbestos Ceilinite, so as to make it conduct heat less readily.

The wheels are steel tired, with separate cast steel spoke centers. The tires are of Latrobe steel with standard M. C. B. tread, fastened by shrinkage and with double lipped retaining rings. The axles are open hearth steel. Key seats are milled in the wheel seats and gear seats. The gears are forced on at about 50 tons pressure and the wheels at about 75 tons. The double elliptic bolster springs are crucible steel. The equalizer springs are of double coil pattern, of open hearth steel and the brake release springs are of the single coil type.

The truck bolster is a steel casting with seats for the center plate, side bearings, spring cap and the chafing surface. The bolster spring seats and their bearings, the side bearings which are bolted to the bolster, the center plate and the combination bracket and guide castings, supporting the brake release springs, are all of cast steel. The journal boxes are of cast steel, Symington type, machined for the M. C. B. standard journal bearing and wedge and for the box cover, and are provided with Soule dust guards. The brake head is of standard M. C. B. pattern, of cast steel. The brake shoes are of the Diamond S type, composed of soft gray iron with chilled inserts and provided with wrought steel backs. Fig. 2 shows the truck with the motor and the third rail shoes

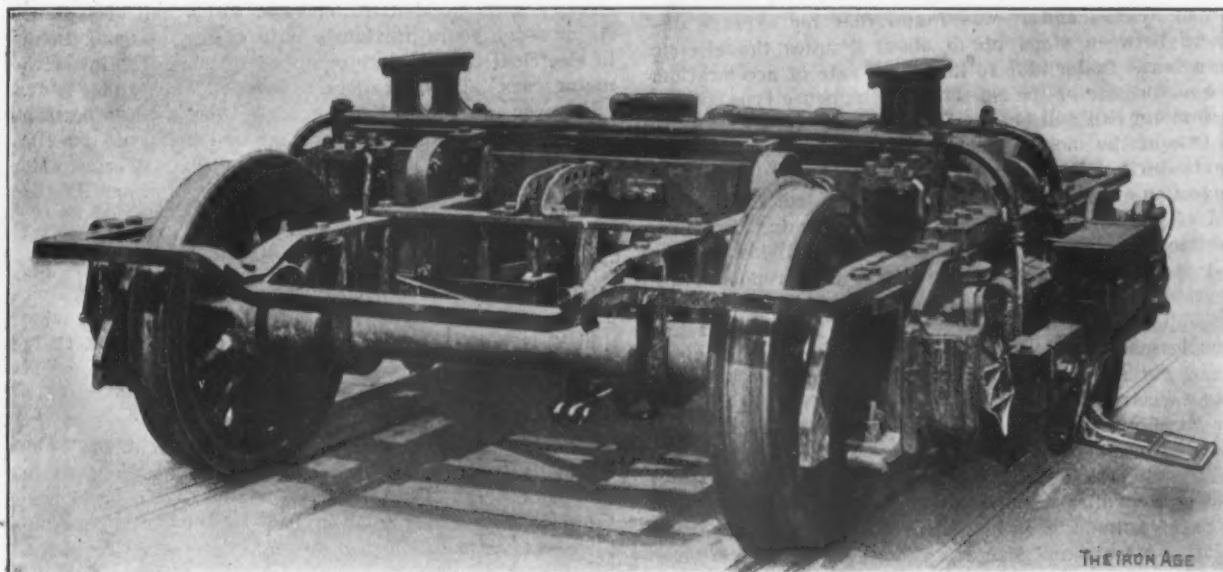


Fig. 3.—A Trailer Truck.

The side windows raise from the bottom and the deck sash are operated simultaneously by levers at both ends of the car. All window capping and other moldings inside the car are of aluminum shapes.

There are 130 motor cars and four trailers, all of which were built at the Berwick, Pa., shops of the American Car & Foundry Company. Fig. 1 is a view of a completely equipped steel car, showing the vestibule end door closed, as it appears when the vestibule is being used as a motorman's compartment.

The motor and trailer trucks are of the M. C. B. type, the wheel base of the motor trucks being 6 ft. 8 in. for 36-in. wheels and that of the trailer trucks 5 ft. 6 in. for 30-in. wheels. The truck bolster and truck center plates are steel castings; the side frames are wrought iron; the end frames, steel channels and the pedestals forgings lipped over the sides of the side frames. The transom consists of rolled steel channels resting in the side frame castings and provided with chafing plates of wrought iron. The equalizer bars are wrought iron in one piece, without welds. The pedestal caps are wrought iron of the individual type secured to the pedestals. The transom top braces are wrought iron; the spring plank steel channel; the brake hangers, rods, levers and equalizing beams in the brake rigging are forged iron and the pins throughout the brake rigging are case hardened. The motor suspension consists of a steel wearing plate on which the motor nose rests on the transom with a wrought iron strap reaching over the nose and bolted to the transom.

mounted upon it. The trailer trucks are of generally similar type, but of somewhat lighter construction. One is shown in Fig. 3. Both motor and trailer trucks were manufactured by the Baldwin Locomotive Works.

The standard third rail shoes on the Long Island cars are of hinged slipper type, supported on the usual wooden beam, which is clamped against the notched face of the equalizer spring seat castings, providing means for vertical adjustment. Trains from the Brooklyn Rapid Transit Company's elevated lines operate over parts of the Long Island system, and as the third rail of the former is located nearer the track rail and at a different height than that of the latter, it was necessary to devise a shoe adjustable to either third rail, and able to change automatically from one to the other at reduced speed. Such an arrangement has been worked out, and patents applied for by James C. Boyd. It consists essentially of a hinged slipper shoe mounted upon a movable lug, which is held in either position by coil springs and is actuated by an arm that engages with a stationary cam alongside of the track, in line with the third rail. The car passing this cam in one direction changes the shoe from the inner to the outer low position, and in the reverse direction from the outer to the inner raised position. These adjustable shoe equipments have been fitted to such cars of the Brooklyn Rapid Transit Company as are to operate over the lines of the Long Island Railroad.

The cars are equipped with hand brakes and with the Westinghouse quick service automatic airbrakes, of the

new design developed from the quick action brake. Compressed air is supplied by an electrically driven air compressor on each motor car, having a capacity of 24 cu. ft. of free air per minute through separate reservoirs to both the air brakes and the pneumatic control system. The quick service brake differs from the standard passenger service apparatus in that it has quick serial service application, graduated release of cylinder pressure, quick charging of auxiliary reservoirs and protection against over pressure. The first is obtained by venting the train pipe air into the brake cylinder in each service application in the same way as is done by the quick action brake in emergency. The time required to fully set the brakes is in this way reduced approximately one-half. The efficiency of the brake is still further increased by the graduated release feature. The average time required for stopping the train in local service with the device is reduced from 30 to 40 per cent. The main reservoir pressure is from 80 to 95 lb., the train pipe pressure being 70 lbs.

In selecting the electrical equipment it was concluded that the greatest flexibility would result from two motor cars using the most powerful motors practicable. The largest trucks that could be used restricted the size of the motor to about 200 hp. At the outset a series of speed tests was made to compare steam and equivalent electric trains, and it was found that for average distances between stops up to about 2 miles the electric train is the faster, due to its higher rate of acceleration. The motors are of the No. 113 Westinghouse type, two to each motor car, and both mounted on one truck.

One of the most important electric railroad developments during the past eight years has been the gradual perfection of systems of multiple unit control from either end of any one of the motor cars in a train. By them electric train operation has been simplified, locomotives and accompanying dead weight have been rendered unnecessary for suburban trains, the number of train and switching movements to accomplish a given result has been lessened, and trains of one or more cars can be made up or cut apart. The special features of the Westinghouse electro-pneumatic multiple control system adopted for the Long Island Railroad cars are: air operation of switches, use of storage battery current for controlling the main switches, indirect system of control from a small master controller with small currents and train line conductors, automatic progression of switch operation in starting a train and protective features.

Air pressure as an actuating force for making and breaking switch contacts permits an application of considerable power at the contact with relatively light and simple means. The use of storage battery current for controlling the main switches avoids the use of 600-volt current in the control system, and any bad effects from the potential fluctuation. The indirect system of control involves the use of main switches on each car, which are actuated through a master controller by the motorman. The automatic feature of operation secures a regular progressive action of the switches independently of the motorman's handling of the controller, or of any accident to the train line. The switches are moved only in a predetermined manner through a system of interlocks, and the operating current is limited to a certain amount, insuring an automatically constant rate of acceleration. In the various details of the design the control has been made as nearly as possible proof against the operator's errors, or excess or failure of the main current supply. The connection of the control system with the air brake system lends itself to the introduction of features for automatically protecting the train from accident. The auxiliary control circuit through small electro magnets operates the air valves, which admit air to the cylinders, whose pistons when forced in and out make and break the contacts of the main control system. There is one master controller at each end of every motor car.

The lighting of the car is divided into five independent circuits for interior illumination, besides a separate circuit at each end controlling the vestibule dome lights and the signal markers. The incandescent headlight is in series with a resistance and is independent of all other circuits. The headlight is controlled by a separate switch, but the marker and dome lights are so controlled

that when the latter are turned out on either end of the car the former are turned on. This is for the accommodation of the motorman, whose vestibule at night must be dark, except for the gauge lamp, while the headlight and markers are to be lit only at his end of the car. The interior of each car is lighted by 26 16-cp. incandescent lamps. Two 16-cp. lamps are placed in each vestibule in such a manner as to effectively light the platform and steps. One 16-cp. lamp is located in each marker, and a 50-cp. lamp is placed in each headlight.

The cars are heated with electric heaters of the panel type, placed under the seats. There are 24 in the body of the car and one of a special type at each end in the motorman's cab. Variation in the amount of heat is accomplished by having two sets of heater coils, one of twice the capacity of the other, thus providing three degrees of heat. The heaters in the steel motor cars were supplied by the Consolidated Car Heating Company; those in the wooden trailer cars by the Gold Car Heating & Lighting Company.

The total weight of a steel motor car, including an estimated maximum passenger load of 16,000 lb., is 98,138 lb.

The 130 steel cars now constructed and equipped have been in successful operation for over a year. Besides the steel cars, 55 wooden trailer cars, which had been built six or seven years previously with a view of using them in electrical trains, were equipped to run in trains with motor cars. These trailers are 46 ft. long and 8½ ft. wide over all. They had formerly been used in certain Long Island Railroad trains that had been run on the Brooklyn elevated lines. They have open platforms, side doors and cross seats and seat 56 people, and are lighted by 36 16-cp. lamps.

Five electric express cars have been built, equipped with standard motor and trailer trucks, two 200-hp. motors and with the multiple unit control apparatus. These cars are of wood, 52 ft. 5 in. long, 9 ft. 9½ in. wide and 12 ft. 6¾ in. high. They are equipped with M. C. B. couplers and haul the old regulation steam baggage and express cars as trailers. The weight of these baggage cars is about 76,000 lb., without load.

Reference was made in a former article on "The Electrification of the Long Island Railroad," printed in *The Iron Age*, November 2, 1905, to the two all-steel portable substation cars which were designed to carry a complete rotary converter substation of 1000-kw. capacity, being so fitted that they can be used at a number of different places where connections to the high and low tension distributing systems could be made. These portable substation cars are 38 ft. 4 in. long, 9 ft. 10 in. wide and 12 ft. 9⅞ in. high and entirely of steel. The weight of the equipment carried is 142,100 lb., and of the car alone 49,000 lb. The car is carried on a freight truck of the standard type and has no motors, but is hauled from place to place. Its superstructure is readily taken apart to enable it to be run into a substation and placed under the traveling crane when repairs are necessary.

A rotary snowplow has also been provided, built by the Peckham Mfg. Company, and equipped with one motor and one trailer truck of standard type and all of the regular motor car electrical equipment. A set of revolving blades with fan and housing is mounted at each end of the car, operated by one line shaft and fitted with two friction clutches, one for each end section, the center section carrying two 50-hp. railroad type motors, run by a series parallel controller.

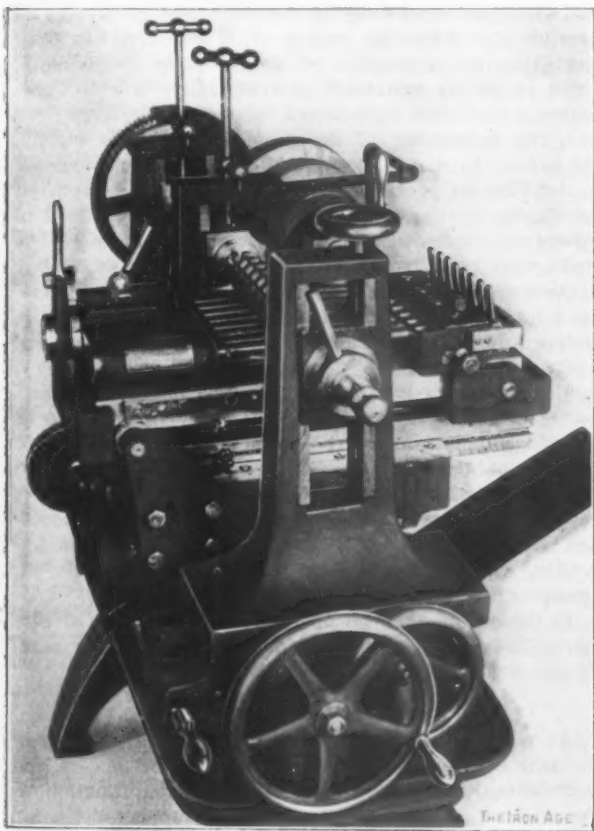
The facilities for inspecting and repairing electric cars consist partly of a section of the original car shop at Morris Park, which has been remodeled, and two inspection sheds, one at Rockaway Park, the other at Dunton. The two latter structures are entirely new and are fitted only for inspecting trains, while the car shops at Morris Park are fitted with the necessary machine tools for repair work.

The equipment of the steel passenger cars, the auxiliary rolling stock and the building of the inspection sheds were carried out by Westinghouse, Church, Kerr & Co., who, as in the other portions of the complete equipment, acted as consulting engineers. The entire work of de-

sign and construction was in charge of George Gibbs, chief engineer of electric traction of the Long Island Railroad.

Garvin Eight-Spindle Reamer Centers.

A milling machine equipped with a special attachment for handling eight pieces of duplicate work at one operation is shown in the accompanying engraving. The attachment, a recent product of the Garvin Machine Company, New York City, comprises eight sets of simultaneously operated index centers, and is particularly suited for such work as the fluting of reamers. In cutting teeth on an irregular reamer it has the advantage over the usual arrangement that the teeth on the different sections do not have to be cut separately, the cutter being able to follow the outline automatically, as will be described later. This feature adds to the rapid producing ability of the machine, but the greatest saving of time is gained



The Garvin Eight-Spindle Index Centers Applied to a Milling Machine.

by making eight pieces in the time ordinarily required for one.

In the illustration the work shown on the machine consists of eight bridge reamers, each having a straight body and a taper end, and all operated upon at one time and indexed simultaneously. The tailstock is adjustable and each spindle has an independent forward movement by a spring, with a separate handle to throw it back. All eight spindles are bound simultaneously by one screw on each side of the tail block. This is accomplished by using a binder plug similar to a turret tool binder between each pair of spindles, and the two binders for each group of four spindles rest on two wedges, which are forced apart by right and left hand screws with freedom to equalize between the two plugs. Each piece of work has a Morse taper tang, which fits a slot in the end of a headstock spindle. A small center supports the work, while the slot holds it from rotating, except when being indexed.

The headstock and tailstock are mounted on a tilting table carried on the regular table of the machine, being

pivoted at the tailstock end and provided with steady guides at the head end. To the saddle of the machine are attached two brackets, one on each side, carrying rollers, and on each side of the tilting table is secured a steel former which rests on one of the fixed rollers. The power feed to the main table being thrown in the formers are pushed along over the fixed rollers and force the tilting table to rise and fall to accommodate the profile of the work. The weight of the slide and the pressure of the cut and feed keep the table down and prevent chatter.

It is obvious that the principle of this multiple center attachment is applicable to many other kinds of work besides fluting reamers, such as milling breech blocks of guns, or other irregular pieces having a rounded edge precluding form milling and affording a simpler design than that of a swinging cutter spindle.

The machine illustrated has a capacity of 120 reamers a day; the centers take up to 1 1/4 in. diameter by 14 in. long, and the total weight is about 2250 lb.

Nichtheroy Power Development in South America.

The city of Nichtheroy, some 30 miles north of Rio de Janeiro, Brazil, has given its name to a new electric transmission system for supplying power and light to the towns of Cascatinha and Mage, as well as the title city. Electricity is to be generated by water power and transmitted at 44,000 volts to substations at the cities mentioned.

The installation is representative of the most modern engineering. At the main generating station the initial equipment will comprise three three-phase revolving field 2000-kw. generators built by the General Electric Company. These machines, as well as two 75-kw. exciter sets, will be driven by water wheels made by J. M. Voith & Co., Wurttemberg, Germany. The excitation current for the main generators will be furnished at 220 volts, the generator voltage being 2300. This voltage will be stepped up to 44,000 volts in a bank of six water cooled transformers, each having a capacity of 1000 kw. and operating at 60 cycles. There will also be a spare 1000-kw. transformer and a 3000-kw. generator as a reserve. A very complete switchboard will be installed, all switches as well as rheostats being electrically operated from the board by remote control, so that there will be no high tension wiring at the switchboard.

From the main generating station the power is to be delivered over a steel tower line to the three substations. At the substations the transmission voltage is reduced to 8600 volts for the local delivery. For this purpose there will be four 750-kw. transformers at Nichtheroy and four 350-kw. transformers at each of the other stations. In each station one of the four transformers will be installed as a reserve. The complete electrical installation for this latest South American development will be furnished by the General Electric Company through its representatives, Guinle & Co.

Tests seem to indicate that the strength of a grindstone is considerably reduced when it is wet. The wetting not only decreases the tensile strength of the material, but it adds weight and thus augments the centrifugal pull at a given peripheral speed. The reduction of strength appears to be as much as 40 or 50 per cent. A dry section of stone broke under a stress of 146 lb. per square inch. Another section of the same stone, soaked over night in water, broke at 80 lb. A better stone, under the same conditions, broke under stresses of 186 lb. per square inch when dry and 116 lb. when wet. Much difference of opinion prevails as to the maximum safe allowable speed at which to operate the stones. Some grinders use a peripheral speed as high as 4500 ft. per minute, while others limit it to 2500 ft. Little difference is observed in the liability to breakage, this leading to the conclusion that a frequent cause of breakage must be hidden flaws or cracks, which would permit the disruption of the stones at the lower speeds.

The Mining Engineers in London.

LONDON, July 30, 1906.—A very largely attended reception by the Lord Mayor and Mayoress took place at the Mansion House on Tuesday evening, July 24. The Lord Mayor is Octavius Vaughan Morgan, one of the proprietors of the *Ironmonger*, and in former years actively associated with his brothers in the management of the great Morgan crucible works at Battersea. Both the Lord Mayor and his brother, Septimus Vaughan Morgan, have withdrawn from the active conduct of the affairs of the enterprises which they built up, and are devoting their energies to public undertakings.

The Mining Engineers' Session.

On Wednesday morning, July 25, a general meeting of the American Institute of Mining Engineers was held at the Institution of Civil Engineers, a very large number of members of the Iron and Steel Institute being also in attendance. Proceedings were opened by the reading of the presidential address by Robert W. Hunt, of Chicago.

At the close of President Hunt's address he made the announcement that the highest honor in the gift of the American Institute of Mining Engineers, the honorary membership, had been conferred upon John Edward Stead, the famous metallurgist and chemist of Middlesbrough, and Robert A. Hadfield of Sheffield. Both gentlemen were present and in earnest words acknowledged the honor.

Albert Ladd Colby of New York was first called upon to present his paper on a "Comparison of American and European Rail Specifications,"* a very thorough and clear review of the steel rail specifications of the leading countries. The subject is one which is of the most vital importance to the American steel industry, with its growing foothold upon the rail trade of the world.

The session was brought to a close by the reading of a paper by R. H. Lee of Liberty Furnace, Va., on the "Gas Producer as an Auxiliary in Iron Blast Furnace Practice."

On Wednesday afternoon a large party visited the works of John I. Thornycroft & Co., Limited, at Chiswick, the famous constructors of steam launches, screw propellers, torpedo boats and destroyers, water tube boilers and petrol driven vehicles. The Chiswick Works are now chiefly devoted to the manufacture of marine and motor engines, the torpedo boat construction being carried on mainly at a large plant at Southampton. Some of the particularly interesting matters observed were the electrolytic galvanizing and some beautiful and intricate aluminum castings. Another excursion was to the works of J. & E. Hall at Dartford, Kent, who make a specialty of refrigerating machinery for blast furnaces.

In the evening there was a *fête* at Earl's Court, where an Austrian exhibition is in progress.

Thursday morning brought a

Joint Meeting

of the American Institute of Mining Engineers and the Iron and Steel Institute, the first paper being that of Albert Ladd Colby on "Nodulizing and Desulphurization of Fine Iron Ores."† Mr. Colby had collected for inspection a number of samples of materials and product taken from charges worked in current practice. The paper attracted a good deal of attention.

James P. Roe of Pottstown, Pa., read a summary of his paper on the "Development of the Roe Puddling Furnace,"‡ with which the American iron industry is familiar.

The next paper brought before the meeting was that of James E. York, on "Improvements in Rolling Iron and Steel."§ Mr. York confined himself to showing a series of samples of the sections rolled by him, and in the course of the discussion created much merriment by his breezy

* This paper was printed in *The Iron Age* of August 2, and the discussion in the issue of August 9.

† This paper was printed in *The Iron Age* of August 9.

‡ The discussion of this paper was printed in *The Iron Age* of August 9.

§ This paper was printed in *The Iron Age* of July 26.

account of his experiences in developing the universal girder mill at the experimental plant at Duluth and alluding to his relations with Grey. A German engineer analyzed the different methods of universal rolling and called attention to the fact that Hugo Sack as early as 1889 designed and advocated a universal girder mill. The statement was made that a Sack mill to roll girders to any size is now building in Germany.

The proceedings terminated with an enthusiastically applauded vote of thanks to Bennett H. Brough, secretary of the Iron and Steel Institute, in whose hands the whole labor of arranging for the meeting, the entertainments and the tour to the North have rested.

Visits and Entertainment.

A large number of the visiting engineers accepted the conjoint invitation of the president and the council of the Institution of Mining and Metallurgy and of Fraser & Chalmers, Limited, the famous manufacturers of mining machinery, to visit the works at Erith, on the Thames. The Institution of Mining and Metallurgy is an association which has grown out of the periodical gatherings of alumni of the London School of Mines, and has been flourishing for a number of years. The membership, which is closely restricted professionally, is more particularly identified with metal mining and geology, and with the metallurgy of the precious and base metals. The president, A. Claudet, a son of the famous inventor of the Claudet process of silver recovery from roasted cupriferous pyrites, occupied the chair at a luncheon in a marquee, erected near the works for the purpose. The works were then inspected under the guidance of Walter McDermott, managing director of Fraser & Chalmers, and a number of his engineers. The works are splendidly equipped for the building of boilers, roasting furnaces, steam engines, gold dredges and concentrating machinery. Particular interest was aroused in the manufacture and testing of Rateau low pressure steam turbines, Rateau centrifugal pumps and turbo compressors.

Some of the party visited the Knight, Bevan and Sturge works belonging to the Associated Portland Cement Manufacturers, the English cement trust, at Northfleet, Kent, the original home of this branch of manufacture. The plants are being remodeled, largely on American lines.

In the evening the members were entertained at dinner at the Crystal Palace and then witnessed a magnificent special display of fireworks.

At Buckingham Palace.

At noon on Friday a deputation of the American Institute of Mining Engineers, consisting of officers and past officers, was present at an interesting function at Buckingham Palace. R. A. Hatfield, supported by Sir James Kitson and Sir Hugh Bell, presented the Bessemer Medal to the King. Subsequently the Americans in attendance were presented individually, the King expressing the hope that they were having a satisfactory visit.

The afternoon was spent at Windsor, where special privileges were granted to the party in the visit to the castle.

The Institute Dinner.

The American visitors were the guests of the Iron and Steel Institute at its annual dinner, which, by special permission of the Court of Common Council, was held at Guildhall, about 600 persons participating. The hall, which is 153 ft. long and 55 ft. high, was rebuilt after the fire of 1666, the temporary roof in the form of a ceiling being replaced by a handsome Gothic wooden roof 200 years later. With its monuments of Wellington, Pitt and Nelson it is an impressive hall, although it is not acoustically advantageous to speakers. After the loyal toasts the American visitors were treated to an example of what English statesmen and politicians so often do, of seizing such an occasion for speaking to the country at large. The Secretary of State for War, the Rt. Hon. R. B. Haldane, defended the course of the Ministry in proposing reductions in the army. The mining engineers were represented in the toast list by Robert W. Hunt and Dr. R. W. Raymond.

Excursions.

On Saturday there were two excursions, one to the Dover harbor works, at Dover, where the greatest artificial harbor in the world is being completed. The other was to the plant of Thomas Butlin & Co., Limited, at Wellingborough. This firm was the first to smelt Northamptonshire iron ores at the original works of its founder, situated in the town of Wellingborough, during the month of February, 1852. A sample of the first ore used is preserved in the company's offices, while samples of ore shown at the exhibition of 1851 by Mr. Blackwell, and reported upon by Dr. Percy, then of the Royal School of Mines, London, mark their rediscovery in modern times subsequent to the period when the Romans extracted metal from the ore, as evidenced by the occurrence of Roman slags found in some parts of the county. In 1866 this company transferred its works to the present convenient site on the Midland and London and Northwestern systems of railroad communication within 64 miles of the metropolis. The company has four blast furnaces, 55 ft. in height, a pair of which produce 700 tons of foundry and forge pig iron weekly from the local ores. The plant is arranged not so much with the idea of producing quantity but rather quality, with uniformity of product. At quite a recent date a foundry has been added to the plant and special attention has been directed to producing improved direct castings as an alternative economy from those more generally in use and evolved through the intermediate stage of the cupola. The results have been so highly satisfactory as to leave in many cases no necessity for the employment of the cupola. Thus tunnel segments for tube railroads and various other machinable castings are produced of a uniform quality to the extent of 100 to 140 tons weekly, the aim being scientifically to select the ores and then to combine them in accordance with their chemical composition, and so attain what is required instead of mixing different varieties of pig, with a similar end in view, before introduction into the cupola. By these means uniformity of product, economy in production and an improved quality are the results, while the near proximity to the London market offers a further economy to that already obtained by saving in freight to one of the chief markets of consumption, as in the case of the London tube railroads. There is a ready sale both locally and in the London market for the blast furnace slag, which is largely used for macadamizing roads in the place of granite, as well as for artificial flooring and decorative work in private and public buildings.

The Judgment Against Union Machinists.

Widespread publication was made in 1903 of the judgment for \$2500 secured by the F. R. Patch Mfg. Company, Rutland, Vt., against the property of Protection Lodge No. 215, International Association of Machinists. It was obtained in a suit for damages brought by the company on account of a boycott and other injury done by the union while conducting a strike. The judgment remains unsatisfied. All efforts to reverse the original decision were unavailing, various motions being overruled by the State Supreme Court. With a view to enforcing the judgment against the individual members of the union the F. R. Patch Mfg. Company brought suit some time ago before the State Supreme Court against John E. Capeless and others. A decision has been rendered by the court against the contention of the union that the original liability had to be proved over again. The court, in affirming the relevancy of the unsatisfied judgment, emphasized the position that the statutory liabilities attaching to the defendants are analogous to the liability of the individual shareholders for the debts of a corporation. It was held that the liability of the members under the statute upon which the action was based is contractual, that the action is therefore founded on an implied contract and is properly brought by trustee process. The motion to dismiss was overruled and the cause remanded.

The Production of Mica in 1905.

WASHINGTON, D. C., August 10, 1906.—The production of mica in 1905 made an important advance over 1904, according to the annual report of the United States Geological Survey, which has been compiled by George O. Smith. Production was limited to six States—North Carolina, Colorado, New Hampshire, Georgia, South Dakota and New Mexico, the order named indicating their relative rank. The total output of sheet mica for these states, as reported to the Survey, was 851,000 lb., with a total value of \$185,900. Of this quantity North Carolina is credited with 669,000 lb., valued at \$85,000. The increase in production over the previous year was largely in other States, while the larger increase in value may be accounted for in part by high prices reported by producers in those States. A decrease in the average price for the North Carolina product is due to the increasing proportion of small mica produced for electrical uses. The total production of scrap mica in the United States in 1905 was 856 net tons, valued at \$15,255, an increase in value over the production for 1904. North Carolina's output of scrap mica for 1905 was 175 tons, valued at \$2,375. The separation of the production figures for scrap mica and for the smaller sizes of sheet mica becomes more difficult as the use of these small sizes increases.

The production of sheet mica in 1904 was 668,358 lb., valued at \$109,462, and of scrap mica 1096 net tons, valued at \$10,854. Thus the value of the aggregated product of mica in 1905 was \$201,155, as compared with \$120,316 in 1904.

The value of imported mica now used in the United States is twice that of the domestic article. In 1905 1,506,382 lb. of unmanufactured mica, valued at \$352,475, and 88,188 lb. of cut or trimmed mica, valued at \$51,281, were imported, making a total of 1,594,570 lb., valued at \$403,756.

The three principal uses of mica are for electrical insulation, glazing and decoration. The first-named application probably leads in present importance, but the other two uses date back to ancient times, mica antedating glass and also being early used to secure decorative effects.

The increasing use of mica in electrical manufacture has largely modified the demand made upon the mining industry. Small sizes of sheet mica can now be utilized in the manufacture of insulators in lamp sockets, lighting arresters, switch boxes and fuse blocks. More important even is the extensive use that is made of composite mica, micanite, molded mica and other varieties of built-up mica sheets. In the manufacture of material of this class thin laminae of irregular form and different sizes are arranged and cemented together to form thick sheets of any desired size.

The use of mica for stove windows formerly constituted the principal demand for sheet mica, but this has decreased somewhat in recent years. The increased use of sheet mica in incandescent gas lamps and for miners' lamps has kept up the demand for glazing grades, so that whatever comes into the market is readily bought. Sheet mica is also used to some extent for phonograph diaphragms and in various small boxes and other novelties.

Scrap mica is utilized in the manufacture of a superior quality of boiler lagging, a mat of finely divided mica flakes furnishing a fireproof covering that has sufficient strength to be durable, not disintegrating like some other materials, and excelling asbestos and magnesia compound as a nonconductor of heat. The superiority of the mica lagging appears to depend not only upon the low conductivity of the mineral itself, but especially upon the loose texture of the mica mat.

Ground mica is used in somewhat increased quantities, the coarser grades in mica bronzes and paints and also as an absorbent for explosives. Ground mica also forms an ingredient in some heavy lubricants. The finest ground mica or mica flour finds a considerable market with the manufacturers of high-grade wall papers, the luster obtained by the use of the muscovite dust having the advantage of both permanency and brilliancy.

W. L. C.

The United States Steel Corporation's Plants.

A Late List of Iron and Steel Works, with the Products Manufactured at Each Point.

A compilation has just been made by the Traffic Managers' Committee of the United States Steel Corporation subsidiary companies of all the blast furnaces, steel works, rolling mills, fabricating and other works of these companies, together with their track connections. From it we reproduce below the names and locations of the various plants, together with the product of each. The list will be found of value because it is up to date, and also for the reason that it shows the relation of different lines of finishing mills to steel and blast furnace plants, where

they exist together, or in other cases the separate existence of rolling mills to which semifinished material is shipped from other plants. Ninety-seven separate cities or towns appear on the list. Some of these have plants of more than one company. In Pittsburgh proper, for example, five companies are represented. It is a most imposing array of plants. The list of places would be very greatly increased if there were added the iron and coal mines, the coke plants and the points at which docks are operated:

American Bridge Company.

Location.	Mill or works.	Furnace.	Product.
Ambridge, Pa. (Beaver Co.)	Ambridge Plant.		Railroad and highway bridges and steel buildings.
Athens, Pa.	Athens Plant.		Railroad bridges.
Canton, Ohio.	Canton Plant.		Railroad and highway bridges and steel buildings.
Chicago, Ill.	American Plant.		Railroad and highway bridges, steel buildings and axles.
(Deering Station)	Lassig Plant.		Railroad bridges and steel buildings.
Detroit, Mich.	Detroit Plant.		Railroad and highway bridges and steel buildings.
East Berlin, Conn.	Berlin Plant.		Railroad and highway bridges and steel buildings.
Edge Moor, Del.	Edge Moor Plant.		Railroad and highway bridges and steel buildings.
Milwaukee, Wis.	Milwaukee Plant.		Railroad and highway bridges and steel buildings.
Minneapolis, Minn.	Minneapolis Plant.		Railroad and highway bridges and steel buildings.
Pencoyd, Pa.	Pencoyd Rolling Mills.		Structural shapes, shafting, bar steel, bridge iron and steel and billets.
	Pencoyd (B. & C. Department)	Pencoyd (11 open hearth)	Ingots.
Pittsburgh, Pa.	Shiffler Plant.		Railroad and highway bridges and steel buildings.
Toledo, Ohio.	Toledo Plant.		Railroad and highway bridges and steel buildings.
Trenton, N. J.	Trenton Plant.		Railroad and highway bridges and steel buildings.

Empire Bridge Company.

Location.	Mill or works.	Furnace.	Product.
Brooklyn, N. Y. (on Newtown Creek)	Brooklyn Plant.		Railroad and highway bridges and steel buildings.
Elmira, N. Y.	Elmira (North Shop)		Railroad and highway bridges and steel buildings.
	Elmira (South Shop)		Railroad and highway bridges and steel buildings.

American Sheet & Tin Plate Company.

Location.	Mill or works.	Furnace.	Product.
Anderson, Ind.	Anderson Works.		Tin plates and black plates.
Bridgeport, Ohio.	Etna Standard Works.		Black sheets, galvanized sheets, light plates, roofing.
Cambridge, Ohio.	Cambridge Works.		Black plates.
	Guernsey Works.		Black sheets, galvanized sheets and roofing.
Canal Dover, Ohio.	Canal Dover Works.		Black sheets, light plates, galvanized sheets, roofing.
Canton, Ohio.	Canton Works.		Black sheets.
Chester, W. Va.	Chester Works.		Tin plates and black plates.
Cleveland, Ohio.	Crescent Works.		Tin plates and black plates.
Connellsville, Pa.	Humbert Works.		Tin plates and black plates.
Demmler, Pa.	United States Works.		Tin plates and black plates.
Dresden, Ohio.	Dresden Works.		Black sheets.
Elwood, Ind.	American Works.		Tin plates and black plates.
Gas City, Ind.	Morewood Works.		Tin plates and black plates.
Hyde Park, Pa.	Hyde Park Works.		Black sheets.
Leechburg, Pa.	Leechburg Works.		Black sheets.
Martin's Ferry, Ohio.	Laughlin Works.		Tin plates and black plates.
McKeesport, Pa.	Wood Works.		Black sheets, light plates, planished iron, hammered, polished and other specialties.
		McKeesport (2 open hearth)	Ingots.
Monessen, Pa.	National Works.		Tin plates and black plates.
Muncie, Ind.	Midland Works.		Black sheets and light plates.
New Castle, Pa.	New Castle Works.		Tin plates and black plates.
	Shenango Works.		Tin plates and black plates.
New Kensington, Pa.	Pennsylvania Works.		Tin plates and black plates.
	Pittsburgh Works.		Tin plates and black plates.
New Philadelphia, Ohio.	New Philadelphia Works.		Black sheets and light plates.
Niles, Ohio.	Falcon Works.		Tin plates.
Piqua, Ohio.	Piqua Works.		Black sheets and roofing.
Pittsburgh, Pa.	Star Works.		Tin plates and black plates.
	Monongahela Works.		Tin plates and black plates.
Sabraton, W. Va.	Sabraton Works.		Tin plates and black plates.
Saltsburg, Pa.	Saltsburg Works.		Black sheets.
Scottsdale, Pa.	Scottsdale Works.		Black sheets.
	Old Meadow Works.		Black sheets.
Sharon, Pa.	Sharon Works.		Tin plates and black plates.
	Mercer Works.		Black sheets.
Struthers, Ohio.	Struthers Works.		Black sheets.
Vandergrift, Pa.	Vandergrift Works.		Black sheets and galvanized sheets.
		Vandergrift (8 open hearth)	Ingots.
Wellsville, Ohio.	Wellsville Works.		Black sheets, "Wellsville Polished," and other specialties.
Wheeling, W. Va.	La Belle Works.		Tin plates and black plates.

American Steel & Wire Company.

Location.	Mill or works.	Furnace.	Product.
Allegheny, Pa.	Allegheny Works.	Edith (1 blast)	Pig iron.
Allentown, Pa.	Allentown Works.		Rods, wire and nails.
Anderson, Ind.	Anderson Works.		Rods, wire and nails.
Braddock, Pa.	Braddock Works.		Rods, wire and nails.
Carondelet, Mo.	Carondelet Works.		Zinc and spelter.
Cherryvale, Kan.	Cherryvale Works.		Zinc and spelter.
Cleveland, Ohio.	American Works.		Rods and wire.
DeKalb, Ill.	Consolidated Works.	Central (3 blast)	Pig iron.
	H. P. Works.		Rods, wire, nails and fencing.
	DeKalb Works.		Rods, wire and nails.
Donora, Pa.	Donora Works.		Wire, nails and fencing.
Joliet, Ill.	Bluff Street Works.		Rods, wire nails and fencing.
	Meeker Avenue Works.		Wire.
	Rockdale Works.		Wire.
	Scott Street Works.		Wire, nails and fencing.
			Wire and nails.
Neville Island, Pa. (Allegheny County)		Neville Island (1 blast)	Pig iron.
Newburg, Ohio.	Newburg Steel Works.		Billets and rods.
	Newburg Wire Works.		Wire.
		Newburg (1 blast)	Pig iron.
		(6 open hearth)	Ingots.
		Emma (1 blast)	Pig iron.
Pittsburgh, Pa.	Shoenberger Works.		Billets, plates and horseshoes.
		Shoenberger (2 blast)	Pig iron.
		Shoenberger (3 open hearth)	Ingots.
Rankin, Pa.	Rankin Works.		Rods, wire, nails and fencing.
Salem, Ohio.	Salem Works.		Nails.
San Francisco, Cal.	Pacific Works.		Wire and wire rope.
South Sharon, Pa.	Sharon Works.		Rods, wire, nails and fencing.
Troy, N. Y.	Troy Works.		Ingots and billets.
		Breaker Island (2 blast)	Pig iron.
Waukegan, Ill.	Waukegan Works.		Rods, wire, nails, fencing, bale ties.
Worcester, Mass.	Central Works.		Wire.
	North Works.		Wire, nails and bale ties.
	South Works.		Rods, wire, springs, fencing, wire rope and electrical wires, sulphate of iron and oxide of iron.
		South Works (8 open hearth)	Ingots.

Carnegie Steel Company.

Location.	Mill or works.	Furnace.	Products.
Allegheny, Pa.	McCutcheon Mill.		Hoops, bands, cotton ties, bars, skelp, angles, paint, rails.
Bellaire, Ohio.	Bellaire Steel Works.	Bellaire (2 blast)	Sheet bars, billets, blooms, slabs.
Bessemer, Pa.	Edgar Thomson Steel Works.		Pig iron.
	Edgar Thomson Foundry.		Rails.
		Edgar Thomson (11 blast)	Ingots.
Clairton, Pa.	Clairton Mill.		Ingots.
		Clairton (3 blast)	Ingots.
		Clairton (12 open hearth)	Ingots.
Cochran, Pa.	Duquesne Steel Works.		Billets, blooms and slabs, sheet bars, splices, angles, bars.
		Duquesne (4 blast)	Pig iron.
		Duquesne (14 open hearth)	Ingots.
Columbus, Ohio.		Columbus (1 blast)	Pig iron.
Donora, Pa.	Donora Steel Works and Furnaces (Blooming Mill)		Billets and blooms.
		Donora (2 blast)	Pig iron.
		Donora (12 open hearth)	Ingots.
Etna, Pa.		Isabella (3 blast)	Pig iron.
Homestead, Pa.	Howard Axle Works.		Axles.
Munhall, Pa.	Homestead Steel Works.		Shapes, railroad ties, bars, billets, blooms, slabs, plates, track scales, armor plate, steel piling.
		Homestead (60 open hearth)	Ingots.
Mingo Junction, Ohio.	Mingo Steel Works.		Billets, blooms, slabs, sheet bars, bars and skelp.
		Mingo (4 blast)	Pig iron.
New Castle, Pa.	New Castle Steel Works.		Hoops, bands, bars, skelp, cotton ties.
Monessen, Pa.	Monessen Mill.		Billets, sheet bars.
		New Castle (4 blast)	Pig iron.
Niles, Ohio.		Niles (1 blast)	Pig iron.
Pittsburgh, Pa.	Clark Mill.		Hoops, bands, bars, skelp, cotton ties, shapes.
	Painter Mill.		Hoops, bands, skelp, cotton ties, bars.
	Upper Union Mills.		Structural material, skelp, shapes, plates, bars, &c.
	Lower Union Mills.		Pig iron and furnace products, spiegel, ferromanganese.
		Lucy (2 blast)	Pig iron.
Rankin, Pa.		Carrie (7 blast)	Pig iron.
Sharon, Pa.	Sharon Steel Works.		Billets, blooms, slabs, angles and skelp.
		Sharon (1 blast)	Pig iron.
		Sharon (6 open hearth)	Ingots.
Shenango, Pa.	Greenville Mill.		Bands, bars and skelp.
South Columbus, Ohio.	Columbus Steel Works.		Billets, blooms, sheet bars, slabs.
		South Columbus (1 blast)	Pig iron.
South Sharon, Pa.	South Sharon Steel Works (Blooming and Plate Mills)		Billets, blooms, plates and sheet bars.
		South Sharon (3 blast)	Pig iron.
		South Sharon (12 open hearth)	Ingots.
Youngstown, Ohio.	Ohio Steel Works.		Billets, sheet bars and rails.
		Ohio (4 blast)	Pig iron.
	Lower Union Mill.		Bars, shapes, bands.
	Upper Union Mill.		Hoops, cotton ties, bars, angles, shapes and skelp.
Zanesville, Ohio.		Zanesville (1 blast)	Pig iron.

Illinois Steel Company.

Location.	Mill or works.	Furnace.	Products.
Buffington, Ind.	Cement Plant No. 3.		Cement.
Chicago, Ill.	North Works.	Union (2 blast)	Pig and spiegel iron.
			Structural material and cement.
Joliet, Ill.	Joliet Works.	North (2 blast)	Pig and spiegel iron.
			Billets, rail fastenings, merchant iron and rods.
		Joliet (4 blast)	Pig iron.
Millwaukee, Wis.	Bay View Works.		Merchant iron, rail fastenings, light rails.
		Bay View (2 blast)	Pig iron.
South Chicago, Ill.	South Works.		Billets, structural material, rails, plates, cement.
		South (11 blast)	Pig iron.
		South (24 open hearth)	Ingots.

Lorain Steel Company.

Location.	Mill or works.	Furnace.	Products.
Johnstown, Pa.	Shops.		Car trucks, forgings, castings, frogs, switches and rail fastenings.
	Iron Foundry.		
		Johnstown (2 open hearth)	Ingots.

National Tube Company.

Location.	Mill or works.	Furnace.	Products.
Benwood, W. Va.	Riverside Department: Riverside Steel Works..... Riverside Rolling Mills..... Riverside Pipe Works..... Semet-Solvay Coke Works.....	Riverside (2 blast).....	Billets. Pipe steel. Wrought pipe. Coke. Pig iron.
Chester, Pa.	Chester Department: Pipe Works.....		Wrought pipe.
Christy Park, Pa.	Seamless Department: U. S. Seamless Tube Works.....		Carbonic acid gas cylinders, shrapnel and projectile forgings. Cold drawn seamless tubing.
Cohoes, N. Y.	Cohoes Department: Pipe Works.....		Butt weld pipe.
Ellwood City, Pa.	Seamless Department: Standard Seamless Tube Works.....		Cold drawn seamless tubing.
Lorain, Ohio.	Foundry..... Rolling Mills..... Steel Works..... Tube and Pipe Works.....	5 blast.....	Pig iron. Castings, ingot molds. Pipe steel. Billets, blooms, rails, slabs, splices. Wrought pipe and boiler tubes.
McKeesport, Pa.	National Department: Monongahela Steel Works..... National Rolling Mills..... National Forge..... National Tube and Pipe Works.....	Monongahela (3 blast).....	Steel billets. Pipe steel. Charcoal blooms. Wrought pipe and boiler tubes. Pig iron.
Middletown, Pa.	American Department: Pipe Works.....		Wrought pipe.
New Castle, Del.	Morris-Tasker Department: Tube and Pipe Works.....		Wrought pipe.
Oil City, Pa.	Oil City Department: Pipe Works.....		Wrought pipe.
Philadelphia, Pa.	Allison Department: Tube Works.....		Iron boiler tubes.
Pittsburgh, Pa.	Continental Department: Elba Rolling Mill..... Pipe Works..... National Department: Republic Iron Works..... Pennsylvania Department: Pipe Works..... Pittsburgh Department: Pipe Works.....		Pipe iron. Wrought pipe. Pipe iron and steel. Wrought pipe. Wrought pipe.
Riverton, Pa.	National Department: Boston Iron and Steel Wks.....		Pipe iron and steel.
Steubenville, Ohio.	Riverside Department: Steubenville (1 blast).....		Pig iron.
Syracuse, N. Y.	Syracuse Department: Tube Works.....		Iron and steel boiler tubes.
Versailles, Pa.	National Department: Galvanizing Works.....		Trolley poles, lead joint pipe, gas tanks, signal pipe, general tubular job shop. Galvanized wrought pipe.
Wheeling, W. Va.	Riverside Department: Nail Factories..... Bar Mill.....		Cut nails. Pipe steel.
Youngstown, Ohio.	Youngstown Department: Pipe Works.....		Wrought pipe.

Shelby Steel Tube Company.

Location.	Mill or works.	Furnace.	Products.
Albany, Ind.	Factory N: Seamless Tube Works.....		Cold drawn seamless tubing.
Ellwood City, Pa.	Factory B: Seamless Tube Works.....		Cold drawn seamless tubing.
Greenville, Pa.	Factory C: Seamless Tube Works..... Rolling Mill.....		Cold drawn seamless tubing. Tube billets.
Hartford, Conn.	Factory M: Seamless Tube Works.....		Cold drawn seamless tubing.
Shelby, Ohio.	Factory A: Seamless Tube Works..... Rolling Mill.....		Cold drawn seamless tubing. Tube billets.
Toledo, Ohio.	Factory D: Seamless Tube Works..... Rolling Mill.....		Cold drawn seamless tubing. Tube billets.

The Colorado Fuel & Iron Company's Year.

The preliminary estimate of the fiscal year's earnings of the Colorado Fuel & Iron Company, which was sent out from Denver last week, proves to have been considerably larger than is shown by the official statement just published. The company's income account for the year ended June 30, 1906, is as follows, compared with the two previous years:

	1906.	1905.	1904.
Gross	\$22,320,045	\$18,615,017	\$8,625,675
Operating and maintenance expenses	19,761,017	17,140,824	8,622,408
Net	\$2,559,028	\$1,474,193	\$3,267
Other income.....	505,701	447,855	27,945
Total income.....	\$3,064,729	\$1,922,048	\$31,212
Fixed charges, taxes, sinking fund, &c.....	2,392,917	2,264,041	1,616,068
Surplus.....	\$671,812	*\$341,993	*\$1,584,856

* Deficit.

In the fiscal year 1903 the company's operations showed a surplus of \$283,612, from which was paid a dividend on the preferred stock of \$80,000. The dividend has been passed since then. The earnings for the last three fiscal years were divided as follows:

	1906.	1905.	1904.
Iron department.....	\$12,454,643	\$9,171,202	\$5,005,911
Fuel department.....	9,502,106	9,073,657	3,455,496
Miscellaneous	363,296	370,158	164,268

Totals.....\$22,320,045 \$18,615,017 \$8,625,675

During the past year the company was burdened with expenses of \$238,844 for excess cost of Lake Superior iron ore over what the same quantity of ore would have cost had it been obtainable from the company's mines. It is not thought likely that this contingency will arise again. The company also expended for enlargements and improvements the sum of \$740,166.

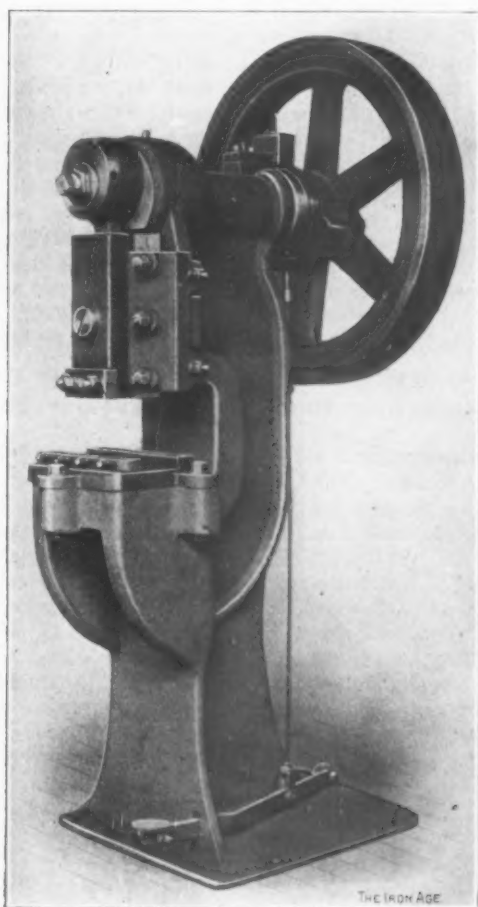
In his remarks concerning the year's operations President F. J. Hearne says: "The company has now been put on a basis where a surplus of earnings is shown above all requirements for operation, fixed charges, &c., and barring unforeseen contingencies may be expected to show substantial increases in both gross and net earnings with each succeeding year."

Charles H. Besly & Co., Chicago, will have on exhibition at the Olympia Exhibition, to be held in London, England, from September 15 to October 17, 1906, their Besly spiral grooved steel disk grinder and their Helmet spiral paper and cloth circles.

The Cady Power Presses.

A number of improvements have recently been made in the line of power presses built by the Cady Machine Company, Cleveland, Ohio. Principal among these are the following: The replacing of the cast iron pitmans with steel pitmans; the making of the jib for the plunger removable, so that the plunger may be taken out without removing the shaft; the fitting of the flywheel with two engaging pins, so that it may be thrown in on the half revolution, and the applying of a brake shoe to the clutch collar to prevent the shaft from turning too far in any case.

The entire line of presses has been redesigned, and the parts are now made from new and more approved patterns. The range of work to which the presses are adapted includes nearly every kind of blank cutting, punching, perforating, forming and bending, and covers a large part



One of the Smaller Power Presses Built by the Cady Machine Company, Cleveland, Ohio.

of the operations incident to the manufacture of hardware and many sheet metal articles. Oil cups of improved construction supply oil to the shaft, which is made of hammered steel and has extra large bearings.

The adjustment of the slide is effected through an eccentric bushing, admitting of quick adjustment and giving solid metal through which to transmit the pressure from the crank pin to the die. The dies can be set with the flywheel running without any danger to the die, as it is impossible to start the press by pressing the treadle when the slide is down. The wheel can be turned backward to release a punch when stuck in the die and in fitting punches to dies.

The presses are built in seven sizes, ranging in weight from 900 to 8000 lb. All of the presses can be made with a stroke to suit requirements, but the standard stroke for the smallest press is 1 in. and for the largest 2 in. The smallest, illustrated herewith, has a $3\frac{1}{2}$ x $5\frac{1}{2}$ in. opening in the bed, a gap depth of $5\frac{1}{2}$ in. and gap

height of the same amount; the largest press has a 9 x 12 in. opening in the bed and a gap 11 in. deep by 10 in. high.

Submarine Drilling in the Clyde River.

The conditions under which submarine rock excavation must be done are extremely difficult, calling for special apparatus of unusual strength and endurance. This work is greatly hampered by tides, currents, winds and storms. Add to these troubles deep water, irregular bottom covered with mud, sand or other shifting material which fills in almost as fast as removed and an imposing combination of difficulties results.

The tendency to increase the draft of ocean and lake vessels makes the removal of subaqueous rock frequently necessary in the deepening of channels, and it is only because of the improvements which have been made in rock drills that such work may now be done effectively, rapidly and cheaply. In modern submarine drilling, steels are used from 30 to 60 ft. long, sometimes weighing as much as 400 lb. To drill with such steel in hard homogeneous material is a problem, but in poor material and under water, where the drill must run by sense of feeling, difficulties are multiplied and the drill must be massive, powerful, durable and capable of perfect control through all ranges of length of stroke and weight of blow. The drill, mounted on a barge, scow or float fitted with suitable framing to support the drill guides, drills, boilers and other auxiliary apparatus, is towed into place and anchored by cables, anchor chains or spuds, or a combination of these methods, depending upon the rise and fall of the tides and currents to be encountered.

Two barges are at present at work on the Elderslie rock blasting contract at Renfrew, near Glasgow, Scotland, the contractors being Hill & Co., of Plymouth and London, England. The work to be accomplished is very extensive and consists in drilling, blasting and removing rock for deepening the channel in the Clyde River. Many thousands of holes must be drilled, the average depth of each being about 8 ft. Occasionally, however, the bed of the river is such that a depth of 10 ft. is necessary and this must be drilled through a maximum depth of water of 30 ft. Each barge is provided with eight Ingersoll-Rand class HA-1 rock drills. Each drill has a diameter of 5 in. and a length of stroke of 8 in., and will work for many months under the most unfavorable conditions with only ordinary attention. It is solid, durable and as simple as is consistent with a proper regard for the conditions to be met.

From two marine type boilers on either end of the barge, working under 120 lb. pressure, the drills take steam through flexible steam hose and branch pipes fitted with stop valves. Immediately below the stop valves are hand winches, which are used to feed the drills to the work or to raise them from it. The drills are supported in guides and suspended by wire ropes which pass over pulleys at the top of the frame and under pulleys at the bottom, thus allowing accurate feeding of the machines. Behind these winches are secondary and smaller winches, provided with wire rope to hoist the drill steels from the holes and replace them preparatory to drilling. The winches and handles of the stop valves are in close proximity, so that one man can handle each machine.

Submarine tubes which are used in this contract consist in each case of long lengths of 4-in. screwed piping which may be extended to meet the rise of the tide. These tubes are forced through the overlying mud, sand or gravel to the rock bed and serve to keep the advancing hole free from extraneous matter. The holes are drilled exactly as in drilling on land, the drill being fed down as far as possible, then being run back, a longer steel inserted and so on until the desired depth is reached, when the steel is removed and the hole charged with explosive through the tube. The casing tube is then removed, the wires connected with the blasting battery and explosion effected without shifting the barge. From the time of starting the first drill to finishing a set of eight holes the average time consumed is from 2 to $2\frac{1}{2}$ hrs. This work is so extensive that nearly two years have been devoted to it already and another year may be required before it is completed.

The Russell Furnaces.

Fuel economy was the fundamental aim in the design of the oil, coke and coal heating furnaces manufactured by the Russell Economical Furnace Company, Chicago. The coal and coke furnace shown in Fig. 1 is designed for heating stock for forging, bolt heading, tem-

per design is carried down between the furnace shell and the brickwork, thereby reducing heat radiation to a minimum. The brickwork on the ends inside the furnace is staggered and inclines toward the top and permits the blast to expand as it passes up into the fire bed, which obviates the difficulty frequently experienced with fuel adhering to the lining. The furnace is equipped with a four-piece tilting grate controlled by a lever by which

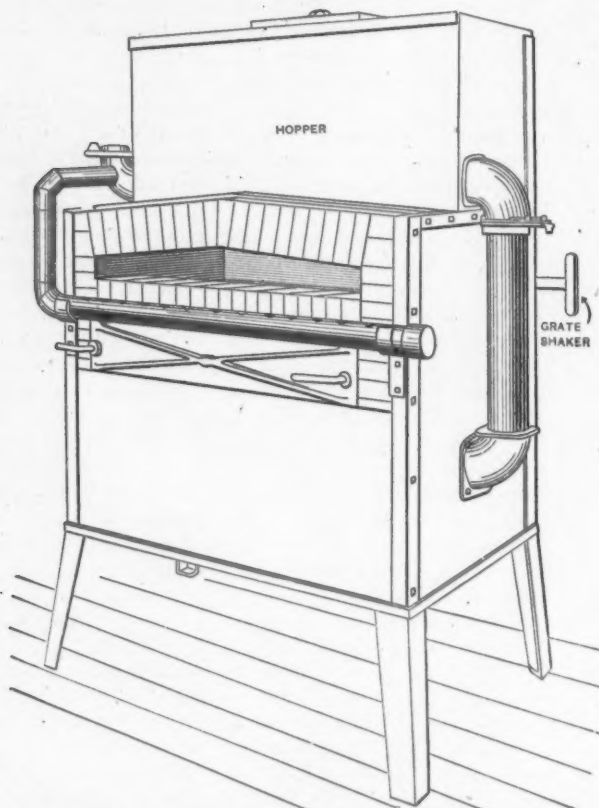


Fig. 1.—The No. 3 Coke Furnace Built by the Russell Economical Furnace Company, Chicago.

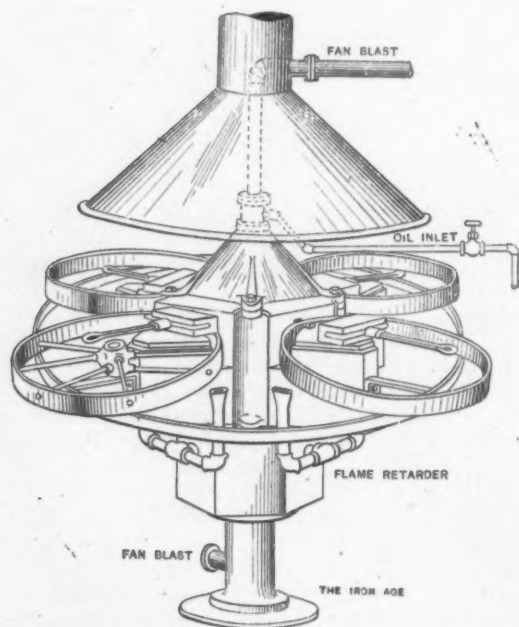


Fig. 2.—Exterior of the Russell Ball Bearing Revolving Furnace.

pering and similar operations. The fuel hopper is entirely inclosed, a cover fitting tightly over the opening through which the charges are made. The blast passes through an air chamber in the hopper and is superheated before coming in contact with the fire bed. The upper section of this chamber forms the bottom of the hopper and inclines toward the opening from the hopper into the furnace. The blast pipe from the air chamber, which is shown outside the furnace bed, in the improved

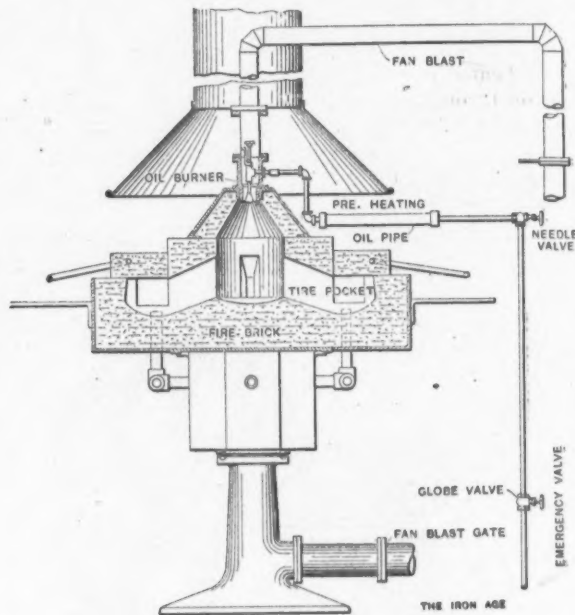


Fig. 3.—Section of the Revolving Furnace Shown in Fig. 2.

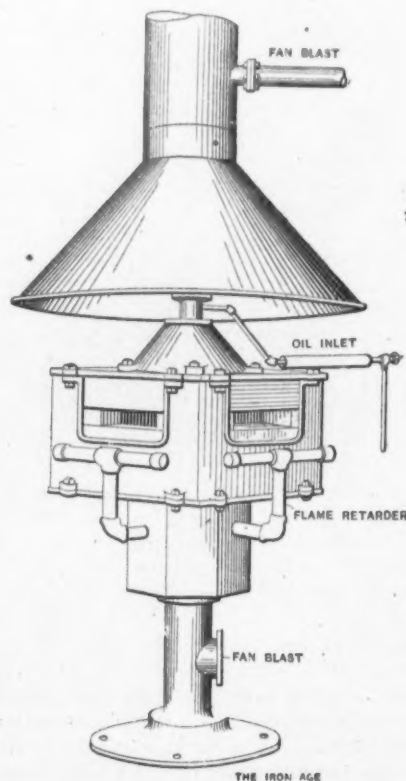


Fig. 4.—Revolving Furnace Intended for Straight Work.

the fire can be dropped or raked as desired. A deflector pipe from the blast main passes along the furnace opening and retards the flames. The front of the brick case has a cast iron frame and is suitably equipped with handles so that it can be lifted out in one piece to make repairs in the furnace interior. The ash pan is removed through a hinged door in the furnace side which is fitted practically air tight. The furnace body is of steel plate reinforced with angles at the corners. The furnace fire-

boxes are of three different sizes, each 3 in. high, 24, 32 and 33 in. wide, and 10, 16 and 18 in. deep respectively. The complete furnace occupies a floor space of 32 x 44 in. and is 66 in. high.

The one-burner ball-bearing revolving furnace shown in Fig. 2, a cross section of which is given in Fig. 3, is designed especially for welding bands and tires. It is made with four or six heating pockets, as desired, and revolves on a cast iron base. The flow of fuel oil is regulated by a needle valve, and the oil is preheated in the large pipe chamber, shown in the cross section, by the waste heat from one of the pockets. The blast is likewise heated before mixing with the oil, as the blast pipe passes through the hood which carries off the gases. The mixture passes over a cone which has an up and down movement and is set slightly eccentric, with the largest opening toward the pocket at the operator's side, giving the hub or tire the greatest heat just before it is lifted off for welding. Flame retarders, fed from an air chamber supplied with blast passing through the pedestal, and which enter each pocket from the bottom, confine the heat to the ends to be welded.

Fig. 4 shows a revolving air furnace similar in construction to Fig. 2, designed for heating straight stock. For heating any distance from the end, for bending, &c, two opposite sides are stopped and the rods or bars are run through the intermediate open sides. For short heats the furnace can be left open on four sides and for long heats three sides can be stopped and the entire heat deflected toward the one opening.

The company in addition to manufacturing these furnaces acts in a consulting capacity on die sinking, drop forging, tool making, punch and die work and machinery installations. Expert opinions are also rendered on piece work prices for forging and forming.

A Proposed Customs Court of Appeals.

At the next session of Congress a strong effort will be made to enact a law creating a customs court of appeals to which all tariff disputes will be referred for adjudication after the Board of United States General Appraisers has passed upon the issues in suit. With this end in view, the promoters of the plan introduced a bill into the House of Representatives near the close of the last session. It was referred to the Committee on Ways and Means. As drawn, the measure transfers jurisdiction in customs cases from the present Federal circuit courts and the Circuit Court of Appeals to the new tribunal. Final appeal to the Supreme Court, however, is retained. The personnel of the new court is to consist of one chief justice and two associate justices, together with the usual attaches of United States courts.

While the interests back of the project for a customs court of appeals have issued no statement of the reasons influencing them to alter existing customs procedure in the courts, it may be said authoritatively that dissatisfaction with the action of the judiciary in disposing of tariff issues and the alleged incompetency of many Federal district-attorneys and their assistants in trying cases are the chief factors in the new movement. It is pointed out that the existing courts are burdened with suits of every conceivable kind, and that on this account customs appeals do not receive the consideration their importance demands. Within a short time the United States courts in New York have been under the necessity of limiting the time in which counsel for the importers and the Government may present arguments. The limitation thus imposed is very distasteful to lawyers engaged in presenting important cases.

The Treasury Department, it may further be stated, is not always pleased with the manner in which the district-attorneys plead Government cases, it being alleged that often the Government side of a controversy is not handled as ably as is the importer's case. The Treasury administration may give its support to the project for a special customs court of appeals, as it is in harmony with the law passed at the last session of Congress creating a customs solicitor, who will have charge of tariff cases not only before the Board of Appraisers, but in the courts

as well, in the discretion of the Attorney-General. Another point urged in favor of a special tribunal is the greater expedition to be obtained in the deciding of issues. There are now more than 84,000 importers' appeals on the pending and suspending files of the Board of Appraisers, and it is argued that with a court devoting all of its time to customs litigation notable progress would be made in clearing the files.

A Domestic Motor Driven Refrigerating Plant

Refrigerating by artificial or mechanical means has seen a remarkable development within a comparatively few years. Originally it was attempted only in an experimental way in scientific laboratories. With later improvements it became commercially practicable in large plants where the amount of refrigeration required was sufficient to warrant the installation and operation of the machinery and apparatus then required. Now the economy of small equipments has been so developed that it has become feasible to employ mechanical refrigeration on a relatively small scale. The almost universal availability of electric current at the present time makes it highly desirable to operate the machinery electrically, and many hotels and public buildings and even in some cases private residences are now equipped with their own plants.

The machines for producing artificial refrigeration depend on the principle of cooling by utilizing the heat absorbing properties of a liquid evaporated to gaseous form, and the most used system is what is known as the ammonia compression system. It consists of a cycle of operations involving three successive steps—compression, condensation and expansion. These three steps are made continuous and are constantly repeated.

A plant of this type has lately been installed in the Gallatin Hotel, at Uniontown, Pa. The ammonia compressor, made by the Brunswick Refrigerating Company, is driven by a Westinghouse 10-hp. motor. From the compressor the liquid ammonia is circulated in coils within a brine tank and returns in gaseous form. The cool brine is used both for making ice for table use and for cooling the beer cellar and ice boxes. Ice cans filled with fresh water are submerged in the brine tank, and the average output of ice is 6 tons per day. A circulating pump driven by a 2-hp. Westinghouse motor forces the brine to the beer cellar, which is 9 x 16 x 7½ ft., and is maintained at an average temperature of 40 degrees F. Besides the beer cellar there are three ice boxes, each 5 x 6 x 7 ft., and one cook's box, 4½ x 5 x 7 ft. Two of the ice boxes are used for freezing purposes and are maintained at an average temperature of 16 degrees F. As an indication of the simplicity and economical operation of refrigerating plants driven by electric motors it is worthy of note that this entire plant is taken care of by a boy.

Charles Hubbard & Co., 81 Fulton street, New York, manufacturers' agents for the sale of iron, steel and coke, are distributing a pamphlet entitled "Iron and Steel," which is a reprint of an article by George Schumann, general manager of the Reading Iron Company, furnished to the *Pilot*, the official publication of the Philadelphia & Reading Railway Department of the Y. M. C. A. This pamphlet presents in its eight pages probably the best condensed descriptions of the several iron and steel processes ever put in print.

Fourteen of the 35 2200-hp. electric locomotives being built for the New York Central Railroad by the General Electric Company and the American Locomotive Company are now completed, and the remainder, it is expected, will be ready for service early in October. These will all be identical to the experimental one finished and tested some time ago, which was described in *The Iron Age* November 17, 1904. The middle of October is the time set for the inauguration of electrical operation between the Grand Central Station and High Bridge on the main road, and Wakefield on the Harlem division.

Gas Producers at Blast Furnaces.*

BY R. H. LEE, LIBERTY FURNACE, VA.

Without doubt one of the most frequent and serious annoyances connected with the practical running of a blast furnace, especially in single furnace plants, is caused by low steam, in spite of the fact that all boilers at blast furnaces have grates for burning coal and that coal is more or less continuously burned upon them, from three to a dozen men being pretty constantly engaged around the boilers as firemen or coal and ash handlers.

At times, when the furnace is "tight," all available men are put on to assist the regular firemen, yet sufficient steam cannot be got to keep the engines up to their regular number of revolutions, while the stoves, deprived of the gas which has been sent to the boilers, run cold, so that when the furnace loosens up and resumes the regular rate of driving the blast is very considerably below normal temperature, and a "cold," or at best a high sulphur, cast is the result. Again, it often happens that a furnace running at its best becomes temporarily a little too hot; the pressure rises, the amount of gas made is diminished, the steam soon commences to go down, and a small scaffold is likely to form before the furnace has been brought back to the proper rate of driving and thus enabled to take its regular amount of blast. The usual remedy is either to "jerk" the furnace by a sudden, brief intermission in blowing or to cool it by lowering the heat of the blast. But if the lower blast temperature be maintained too long the hearth and descending stock may be cooled below the "critical temperature" mentioned by Mr. Johnson†, and the furnace may go to the other extreme and become cold. This is especially the case when coal or coke high in sulphur is used. Possibly a day or more may be consumed in getting the furnace back to normal conditions.

The Value of Reserve Blowing Plant.

The great value of an abundant blast capacity in the handling of a furnace was once brought home to me in a striking manner in the management of a furnace of 250 tons capacity, working on soft coke and a very fine brown hematite, similar in structure and fineness to the Lake Superior Mesaba ores. It was one of a three-furnace group, but the gas mains of the furnaces were not connected. Consequently when steam was low on one furnace no help could be obtained from its neighbors, and the engines of this particular furnace were always run at their full capacity. The soft coke and fine ore gave rise to more or less sticking, which was handled in the usual way. During the campaign the blast main from the spare engine of one of the other furnaces (95 x 21 ft.) was connected with this furnace, so that while the latter depended ordinarily upon its own boilers and engines the spare engine of the large furnace could be put on at once if the pressure of blast began to rise. Since, however, the loss of blast from unavoidable leakage around a furnace increases rapidly with the pressure it was not sufficient to add merely enough blast from the spare engine to make up for the loss measured by the revolutions of the regular engines. Much more than this theoretically necessary amount was always needed. The normal amount of blast used was about 28,000 cu. ft. per minute of from 11 to 12 lb. pressure. The spare engine, a double compound Tod of 30,000 cu. ft. capacity, was generally run at about 20 rev. per. min., thus giving about 15,000 cu. ft. extra. As a rule if the foreman put on the extra engine as soon as the gauge showed the pressure of the blast to be increasing 20 min. sufficed to loosen the stock and get the furnace back to its normal gait; but if, as was sometimes the case, the pressure was allowed to go up 3 or 4 lb. before it was possible to furnish this relief (the spare engine being at work on its own furnace), then one and sometimes two hours of hard blowing were required. The usual remedies of "jerk" and cutting down the heat of the blast were discontinued;

and the only one used afterward was the very simple procedure of turning on the spare engine for a short time, upon which the pressure gradually fell to the normal, when the extra engine was taken off. Under this treatment the furnace was not only more quickly loosened up, but since the rate of driving had not been much reduced the tonnage suffered but little.

It is true that under the various conditions of practice all furnaces do not behave in the same manner, so that adding more blast for a short time may not prove successful in all cases; but situations in which an abundant reserve of blast would be of advantage occur very often, as every furnaceman knows.

A large number of boilers of the best modern water tube types will not effect this result, because as soon as the gas supply to a boiler is reduced the steam must fall from lack of fuel. Firing with coal of course helps to a certain extent; but it does not take the place of abundant gas. Forced draft with hand firing, although better than hand firing with natural draft, is not as efficient as plenty of gas. The automatic stoker avoids the cooling due to frequent opening of charging doors involved in feeding coal by hand; but it is impossible to push the stokers beyond a certain speed, so that, except in the amount of labor required, the machine has no particular advantage over hand firing with forced draft, for the rapid raising of steam in an emergency. Moreover, it is useless to add boilers to a furnace plant beyond a certain limit, because, unless there is sufficient gas to fill the combustion chambers properly, no advantage is gained. On the contrary, the results are not as good as those attainable with fewer boilers and more gas to each one.

Auxiliary Gas Producers.

It seems necessary, therefore, to adopt some other means for supplying additional blast at need; and I can see no cheaper or more feasible means than the use of a gas producer driven by forced draft. With producers the amount of coal burned in good practice would not vary much from what is now used. Even the light fires kept on the boiler grates to keep the gas lit might be dispensed with, since the flow of gas to the boilers would not be checked and there would be no danger of the flames going out. The net calorific effect of coal burned under the boilers and in the gas producers respectively is, if not the same, rather in favor of the producer; indeed, the efficiency of carbon burnt in the form of producer gas is claimed to be from 5 to 25 per cent. greater than that of direct combustion of solid fuel. It is certain, therefore, that no more coal would be used than in the present way, while the producer would give the added advantage of permitting at all times a perfect control of the amount of gas under the boilers. Moreover, a glance at the following average analyses of producer and blast furnace gases shows the greater richness of the former and the great advantage of having them available as a portion of the gaseous mixture burned under the boilers.

Average Analyses of Producer and Furnace Gases.

	A.		B.	
	Producer gas.		Furnace gas.	
	Volume	percentage.	Volume	percentage.
Carbon monoxide (CO).....	22.0 to 30.0		25.0	
Carbon dioxide (CO ₂).....	6.0 to 1.5		13.5	
Hydrogen (H).....	15.0 to 7.0		1.5	
Methane (CH ₄).....	3.0 to 1.5		0.0	
Nitrogen (N).....	54.0 to 60.0		60.0	
	100.0	100.0	100.0	

A, from R. D. Wood & Co.'s pamphlet on Producer Gases; B, from 50 analyses made under the writer's direction.

Separate Main for Producer Gas.

The arrangements for delivering the producer gas to the boilers and the size and form of burners used would naturally vary according as local conditions demand. Either overhead or underground mains could be used, provided there were proper cleaning facilities. Separate mains for the blast furnace gas and the producer gas should be employed, first, in order that the producer gas main could be cleaned without shutting down the furnace, and second, to prevent the producer gas from flowing up the downcomer to the top of the furnace instead of being drawn under the boilers. This would occur only when shutting off the blast, and would be due to insuffi-

* Paper read at the joint meeting of the Iron and Steel Institute and the American Institute of Mining Engineers, London, July, 1906.

† Notes on the Physical Action of the Blast Furnace, *Transactions American Institute of Mining Engineers*, xxxvi, 454.

cient height of the boiler chimney, though this might be otherwise as high as present practice demands. The latter risk could be obviated by means of suitable valves placed between the boilers and the furnace; but such valves would have to be closed at every step, which would be troublesome and therefore might be sometimes forgotten.

The greater cost of separate mains and separate burners at the boilers might be advanced as an argument for turning the producer gas into the blast main from the furnace to the boiler plant; but I believe the two objections above noted would, in the long run, more than counterbalance the saving in first cost resulting from using a single system of mains for both gases.

The use of producer gas in the stoves as well as under the boilers is not suggested as one of the advantages to be secured by having a few producers connected with a blast furnace. If desired, the producer gas could as easily be introduced into the stoves as under the boilers; but its use there would be so infrequent as hardly to warrant the expense of installation. The real advantage of adding producers to a blast furnace plant would be confined to the boilers, where the gain from having an abundant supply of rich gas, under perfect control would very soon repay the cost of installation by increased output and greater regularity of product.

To a plant of three or more blast furnaces gas producers would not be of as great value as to a single furnace; yet even with three or four connected furnaces, coal must be burned under the boilers; and in this case, also, the gas producers would have the advantage over the present mode of coal firing that a greater calorific effect is obtained from the fuel. In either case the labor would be a trifle less and the firing would be under better control, which would mean less variation in the amount of air blown through the furnace with all the well-known attendant advantages of such regularity.

Progress in Fuel Testing at St. Louis.

A conference was held on August 10, 11 and 12 at the Oriental Hotel, Manhattan Beach, New York, of the members of the National Advisory Board on Fuels and Structural Materials for the discussion of the fuel problems especially associated with power development. The following were present, the organization represented being indicated in each case:

- Charles B. Dudley, president American Society for Testing Materials, chairman, Altoona, Pa.
- B. F. Bush, manager and vice-president Western Coal & Mining Company, St. Louis, Mo. (American Institute of Mining Engineers.)
- Henry G. Stott, superintendent of motive power, Interborough Rapid Transit Company, New York. (American Institute of Electrical Engineers.)
- W. F. M. Goss, dean of the School of Engineering, Purdue University, Lafayette, Ind. (American Society of Mechanical Engineers.)
- George H. Barrus, steam engineer, Pemberton Square, Boston, Mass. (American Society of Mechanical Engineers.)
- Richard Moldenke, Watchung, N. J., secretary American Foundrymen's Association.
- A. W. Gibbs, general superintendent of motive power, Pennsylvania Railroad, Altoona, Pa. (American Railway Master Mechanics' Association.)
- I. C. White, State Geologist, Morgantown, W. Va. (Geological Society of America.)
- Admiral Charles W. Rae, Chief of Bureau of Steam Engineering, United States Navy, Washington, D. C.
- Prof. J. A. Holmes, secretary of the Board.

In addition to these members of the committee the following accepted the invitation to attend and join in the discussions of the conference:

- Prof. N. W. Lord, Ohio State University, Columbus, Ohio, chemist for the fuel investigations of the Geological Survey.
- Prof. L. P. Breckenridge, University of Illinois, who is engineer in charge of the testing of fuels under boilers.
- Prof. R. H. Fernald, Washington University, St. Louis, Mo., who is engineer in charge of the testing of fuels in gas producers, etc.
- W. T. Ray, assistant engineer in charge of boiler tests.
- Prof. Chas. E. Munroe, professor of chemistry, George Washington University, Washington, D. C.
- Prof. D. S. Jacobus, Stevens Institute of Technology, Hoboken, N. J.
- E. V. D'Involliers, coal mining expert.
- C. H. Quereau, in charge of electrical equipment of the New York Central Lines, New York, and R. W. Mahon, chemist and engineer in charge of tests, New York Central Lines,

New York, represented J. F. Deems, who was unable to be present. Mr. Deems is general superintendent of motive power, New York Central Lines, and represents the American Railway Master Mechanics' Association on the Advisory Committee.

The committee considered the plans proposed for future work by Prof. L. P. Breckenridge, engineer in charge of the boiler division of the fuel testing plant at St. Louis, Mo. These plans were discussed and approved. Prof. R. H. Fernald, engineer in charge of the gas producer division, outlined plans for the work of his division, which were discussed and approved. In addition to this a general discussion followed of matters relating to the briquetting of coal, the coking of coal and the value of some experiments with denatured alcohol. Professor Munroe outlined the work of foreign governments in experiments on safety devices used in the mining of coal, as well as methods of testing explosives used. The committee discussed the desirability of taking up tests of this character in connection with the fuel testing plant. An interesting discussion, in which Dr. Moldenke, Mr. D'Involliers, Professor Lord, Professor White, Mr. Bush, Professor Holmes and others took part, related to by-product coke and the by-products of retort oven plants.

A great deal of valuable work has already been accomplished at St. Louis. In the boiler division over 400 trials have been made, representing approximately 160 different kinds of coal obtained from 24 different States. The gas producer division reported the possibility of burning almost any kind of bituminous coal in the gas producers and using the product successfully in gas engines. A large amount of valuable information is being obtained in connection with the briquetting of coal wastes, as well as concerning the possibility of coking many coals which have hitherto not been considered available for coking purposes.

The value of the equipment available for experimentation up to the present time is approximately \$150,000. A considerable amount of new equipment will be added to the plant in order to make possible many investigations which have not yet been undertaken.

The Passaic Steel Company.

As a result of the financial complications of the Passaic Steel Company, Paterson, N. J., which have been given considerable publicity in the past few months, action was taken by the Board of Directors at a meeting held August 8, declaring the offices of president, general manager and superintendent vacant. As successor to Niven McConnell, who has held the above offices, Alonzo H. Knapp, a Paterson coal dealer, was elected president. Mr. McConnell was made president at the annual meeting in March, his term being one year from April 1, 1906. He became connected with the Passaic Steel Company on April 1, 1905, as vice-president and general manager, and entered into contract with the company for a term of five years from that date. A feature of this contract was the stipulation that if after one year's service the company desired to terminate Mr. McConnell's official relationship to it, this could be done by paying him \$50,000. It is stated that Mr. McConnell intends to enforce the terms of this contract by legal action.

It was announced some weeks ago that a plan was being matured for exchanging the \$2,500,000 of bonds of the company for preferred stock, but this finally failed of adoption. The plant at Paterson has been operated at only about one-half capacity since the financial troubles of the company assumed an acute form a few months ago, and credit was no longer obtainable. In *The Iron Age* of December 7, 1905, page 1512, details were given of the reorganization plan carried into effect in the fall of 1905, the principal feature of which was the issuing of \$1,000,000 of preferred stock, much of which was taken by the creditors of the company, as well as by some of those who had been prominent in the sale of the Passaic Rolling Mill Company property to the Passaic Steel Company. The failure to make payments on some of these preferred stock subscriptions precipitated the recent crisis. It is stated that efforts at reorganization are still in progress and that the plant will soon resume operations on a larger scale.

Rail Mill Development.

The Bessemer Process in the United States.

The address of President Robert W. Hunt of Chicago was a feature of the meeting of the American Institute of Mining Engineers, held in London on Wednesday, July 25, on the day following the joint meeting of this society and the Iron and Steel Institute. It dealt with the development of the Bessemer process in the United States, chiefly as expressed in the improvements in rail mill construction and methods. Much of the ground covered is familiar to our readers, but President Hunt has introduced in the narrative much that is the fruit of his wide experience and special opportunity for observation. Liberal extracts from the address are presented below. The speaker said at the outset that the organization of the American Institute of Mining Engineers and the introduction of the Bessemer process in the United States were not far apart in point of time, and therefore a meeting in England, the birthplace of that process, made appropriate some account of its American development.

American Possibilities Underestimated.

It will be recalled that in the seventies a distinguished iron metallurgist, whom it has been the pride of both hemispheres to honor, visited America and carefully studied the iron and steel situation. He unhesitatingly proclaimed that the development of her possible production of iron and influence in the markets of the world were plainly limited by geographical conditions to such an extent that the Old World need not fear her rivalry. This prophecy seemed absolutely logical, and based upon conditions which could not be altered or overcome. Indeed, he gave actual figures showing that the transportation distances were so great over which it would be necessary to bring iron ore and the fuel to smelt it to a common point, and then after its reduction the transportation of the products to market would again cover such distances that it was impossible for successful commercial competition to be created. At that time the statement that the transportation of a ton of ore over about 100 miles of railroad and 800 miles of water, including the necessary handling, not only onto cars, but its loading into and unloading from ships, would be regularly performed at a cost not exceeding \$1.40 a ton, and that with about \$1 a ton added to that (or in all \$2.40), the ton of iron ore would be placed at what was then and is now the very center of the American iron industry, would have been received as the wildest lunacy. That has all been accomplished, and instead of having brought disastrous results to the transportation interests it has yielded such profits that they have been built up to colossal proportions. Moreover the finished products can be placed at the seaboard for foreign markets at transportation cost little if any greater than is required for internal transportation in many European countries. These low carrying charges have come along with a tremendous ore development in the Lake Superior region, which has steadily increased until in 1905 there was taken out 34,353,456 gross tons. While many proved millions of tons of ore still remain, it is recognized that such a production cannot be indefinitely maintained. This condition is leading to increased interest in other ore sections, some of which, while well known, have been unworked, either because of location or the comparatively low iron percentage of the ore.

The Record of the South.

The mineral resources of the Southern States greatly impressed Sir Lowthian Bell when he was investigating American iron ore conditions, and he predicted a prosperous future for that region. For some years it seemed as though such hopes were doomed to disappointment. But there is no longer any doubt of the wisdom of the prediction. In 1880 the pig iron production of all the Southern States was 397,000 gross tons. In 1905 it was about 3,100,000 gross tons. At the same time it has not been in iron alone that the South has grown during the past 25 years. In 1880 there was invested in cotton mills \$21,000,000. In 1905 it had increased to \$225,000,000. During the same period the capital invested in the Southern

States in all kinds of manufacturing increased from \$257,000,000 to \$1,500,000,000.

The Low Point in Rail Prices.

As might be expected, with this great revolution in cost of transportation there has also come a revolution in selling prices. While the political policy of the United States has tended to maintain a higher range of prices than would have probably prevailed under other conditions, at the same time it is true that during a time of severe business depression steel rails were made from ore mined at the head of Lake Superior, smelted with coke from Pennsylvania coal, transported about 500 miles to Chicago and there sold, delivered, at \$15 per gross ton. And that price under the then existing conditions was within the cost of manufacture. It is most earnestly to be hoped that such times may not return, but if under pressure that could be accomplished some years ago there is no reason to suppose that under similar stress the history could not be repeated. I mention this incident merely as a matter of record.

It will be recalled that the first heat of Bessemer steel made in America was produced in an experimental plant at Wyandotte, Mich., in the autumn of 1864, and that the first commercial rolling of steel rails was in the Cambria Iron Company's mills at Johnstown, Pa., in August, 1867, from steel made by the Pennsylvania Steel Company at Steelton, Pa. The development of the business was very rapid, but not always attended with profitable results.

Ten Rail Mills Thirty Years Ago.

In June, 1876, there were 10 rail mills in operation and an eleventh was nearly ready to start. At that time one Bessemer company had already gone to the wall. One of these 10 companies as well as the eleventh and their works have absolutely gone out of existence. In fact, but five of them are now making rails. One of these has but a limited production in that department, and the other four are making their rails principally in mills not then in existence.

Since 1876, in addition to those already mentioned, 18 corporations have erected mills to roll standard weight steel rails, 14 from steel of their own manufacture and four from purchased blooms. Seven of the steel producers are now making rails, two are on other products, and the remaining nine have gone out of existence, so that there are now in the United States 10 corporations running 13 rail mills. I only refer to the mills rolling rails of 60 lb. and over per yard. Three of the companies are controlled by one parent corporation, three others by another, and two others by still another, thus leaving two single and independent concerns. In addition the building of another mill of large capacity, to roll basic open hearth rails, with the required blast furnaces, steel furnaces and town, is actively under way.

Early American Practice.

It will be recalled by the older of my foreign hearers that as consulting engineer to the American Bessemer manufacturers Alexander L. Holley made at least yearly visits to Europe, where, largely by reason of his charming and lovable personality, he received free access to practically all steel works, and it was well understood by his hosts that he was seeking information to be used by his American clients. It was also known, on the other hand, that he was ready to freely give in return the best he had. Holley was peculiarly fitted for this post. The information he gained by observation was not used in mere copying, but rather served as a basis on which to build.

In a paper read before the American Institute of Mining Engineers at Philadelphia in 1876 I called attention to the invention by George Fritz, then chief engineer of the Cambria Iron Company, Johnstown, Pa., of the blooming mill on which to roll steel ingots to blooms, instead of reducing them by hammering, as had been the practice. This was first accomplished in 1867 on a modified rail train of rolls. Mr. Fritz built his first regular three-high blooming mill in 1871. This departure from the old practice, added to Holley's modified converting plants, greatly helped to increase production.

Rail Mill Records.

In June, 1876, the Bessemer plant of the North Chicago Rolling Mill Company, built from Holley's plans, and then in charge of Robert Forsyth, held the record for a month's production of ingots at 6457 gross tons. The production in the whole United States in the year 1876 was 469,639 gross tons of Bessemer ingots, from which 368,299 gross tons of rails were made, selling at an average price of \$59.25 per ton with gold at 110.

There was a constant increase in output until 1887, when the production of ingots reached 2,936,035 tons, and of rails 2,101,904 tons. The rails sold at an average of \$37.08 per ton with the currency at par. It was not until 1899 that the rail production again passed to the 2,000,000 ton point. In that year there was turned out 7,586,354 tons of Bessemer and 2,947,316 tons of open hearth ingots and 2,270,585 tons of rails, all of Bessemer steel. The rails sold for an average price of \$28.12 per ton. Following that year there was a continued increase in the output of open hearth steel, while that of Bessemer remained more nearly constant. In 1905 10,919,272 gross tons of Bessemer steel was made, 8,444,836 gross tons of open hearth ingots and 3,375,611 gross tons of rails, 183,264 tons of which was of basic open hearth steel. The rails were practically all sold at a uniform price of \$28 per ton, which has been the standard price from and including 1902.

The North Chicago Rolling Mill Company, which held the monthly record for product of Bessemer ingots in 1876, built in 1882 an entirely new Bessemer and rail plant at South Chicago, some 15 miles away from its old one. The converting works were designed and erected by Robert Forsyth. At first the new rail mill was a reversing one, but Mr. Forsyth entirely remodeled it by putting in a three-high mill with automatic tables. There have been changes in the management and additions to the plant since then, but fundamentally the converting works and mill are the same, and their record production is 91,424 gross tons of ingots and 71,424 gross tons of rails in a month. All of these rails were rolled on one rail mill. It consists of three sets of rolls beside the blooming train, set in echelon, but making one mill, all the steel being reduced through the same passes in the rolls.

In 1886 the rail mill of the Edgar Thomson works had been doing great work, but it was being pressed in output by other mills, and Andrew Carnegie directed Captain William R. Jones, manager of the works, to prepare plans for the very best rail mill he knew how to design. Some time after Mr. Carnegie asked Captain Jones how he was progressing and how much the mill would cost. The Captain replied that he could not then tell. Mr. Carnegie said, "Well, but we must place some limit on its cost." Jones answered: "You told me to design the very best mill in my power; now if I am to be limited by the cost sheet in so doing, I must give up the job." Mr. Carnegie then asked: "But if we build such a mill, how much will you promise to increase its production over the present one, and how much per ton will you save?" Jones replied: "I will promise to double the output and save 50 cents per ton." "All right," was the answer, "go ahead and do your best." The new mill started in 1888, and all promises for it have been much more than fulfilled. Its record production of rails for a month is 61,033 gross tons. There are three sets of rolls in this mill, which are placed tandem. It has been strengthened since Captain Jones' death, but is practically his mill. The converting works have made 102,740 gross tons of ingots in a month, all of which were reduced to blooms on one three-high blooming mill. After the starting of the new mill the original Edgar Thomson rail mill remained idle for several years. It was then remodeled and used for the production of rails, mostly under 60 lb. per yard, and has been in practically constant operation ever since.

The New Mill at Edgar Thomson.

Within the last year another rail mill has been added to the plant, and one which is quite a departure in the business. It consists of two sets of 18-in. rolls placed tandem and equipped with automatic tables, the power in both rolls and tables being electric. It is intended to use

this mill for the reduction of second quality rails of standard sections made on the other mills to lighter ones; but as yet it has been principally used for rolling small sectioned rails from billets.

Reversing Mills.

Following the consolidation of the Lackawanna Iron & Steel Company and the Scranton Steel Company at Scranton, Pa., the rail mill of the former was abandoned, all the work being given to the mill of the latter, which was of more recent construction. It was of the reversing type and with one other constituted the only existing examples of such mills in America. The other one was built by A. J. Moxham, as president of the Johnson Company, in 1888, near Johnstown, Pa., to roll steel girder street car rails. In 1894 this mill was moved to Lorain, Ohio, and is now operated by one of the subsidiary companies of the United States Steel Corporation. While its principal output is girder and other street car rails a large tonnage of standard shapes is also produced. The Lackawanna Steel Company decided to abandon Scranton as a manufacturing point, selecting a new location at West Seneca, N. Y., on Lake Erie near Buffalo. In placing the rail mill in its new location some changes were made, but the reversing type was retained. Rail rolling was resumed upon it in October, 1903.

It is somewhat remarkable that the reversing rail mills in America should have developed such a migratory disposition. I am certain from personal knowledge that in neither case was it caused by unsatisfactory foundations. It is a matter of record that when putting in the foundations at Scranton W. W. Scranton, who built the works, made an innovation on American engineering practice by using concrete instead of stone or brick in his foundation, and with such complete success that the practice soon became general.

Casting Ingots on Cars.

Among the mechanical improvements of the Bessemer converting plants, which did much to increase their output, was the abandonment of the casting pit and the adoption of the present practice of filling the molds while standing on cars. These are immediately thereafter pulled outside of the converting works, and when the steel has sufficiently cooled the molds are mechanically stripped from it, thus saving much manual labor and time. In fact, without this improvement in practice the present output would be impossible. Holley's shallow pit was the first step; this seemingly the final one. I do not know which works first adopted the plan, but it will be found by reference to the Institute's *Transactions*, Volume XIII, that at its New York meeting in February, 1885, L. G. Laureau read a paper in which he proposed so casting and handling the steel. But his plan was to turn the filled molds on their sides and force the ingot out by a hydraulic plunger. Captain Jones subsequently adopted at the Edgar Thomson works that part of the practice. But it was found that with the larger sectioned ingots which had come into use to place them thus hastily on their sides increased the prevalence of pipes. So this, as well as the use of horizontal heating furnaces, was abandoned.

The Introduction of the Mixer.

Another factor in increasing output was the use of metal direct from the blast furnaces. This was not entirely successful until the mixer invented by Captain Jones was adopted. The claim that the credit of this as an invention belonged to him was bitterly fought after his death, and the case was carried to the United States Supreme Court, which decided in his favor. Therefore it must be so considered. That he was the first to venture to accumulate 150 tons and over of molten metal in a refractory lined vessel, from which it was drawn as wanted and taken to the converters has never been denied by any one. He planned the mixer soon after the Edgar Thomson works began the use of natural gas, and he expected to be compelled to rely upon heat from it to keep his iron sufficiently hot. He also thought it might be necessary to agitate the metal in the mixer to insure sufficiently uniform results, and so designed his apparatus. Neither procedure was found necessary. I have wondered if the use of natural gas had not been possi-

ble whether he would have made the venture. Undoubtedly the invention would have come in time, but probably would have been much delayed.

The First Use of Driven Tables.

It is with some modest hesitation that I refer to the part which mechanical appliances at the rolls have performed in the great increase in steel rail output, but without them it would have been impossible. Until March, 1884, all American rail mills were fed by the use of hooks and tongs, and three-high trains required from 15 to 17 men for a production of 300 tons in 12 hr. Numerous inventors had sought to accomplish this work by machinery which would be automatic in its action, but I believe until that time there had not been any actually built. In March, 1884, I introduced driven tables in front of the finishing rolls of the rail train of the Albany & Rensselaer Iron & Steel Company, Troy, N. Y. They worked so well that I put an automatic arrangement in front of the roughing rolls. This was more particularly designed by Max M. Suppes, then master mechanic of that department and now general manager of the Lorain Works of the United States Steel Corporation. Mr. Suppes rendered valuable assistance during all of my experiments. The last table was also successful. Soon after I placed tables on the catcher's side of the train.

Captain Jones at once advised his firm to secure authority and apply the system to the Edgar Thomson mill. This being done, he designed and put in an elaborate system of tables, some points of which he patented. He, Mr. Suppes and myself pooled our interests and later nearly all of the steel companies of the country secured licenses from us. The number of men necessary to operate the rolls was at once reduced from 17 to 5, and I have already given the figures covering the increased production. From 300 to 1500 tons per day is a far cry. Others took up the automatic table matter, and F. H. Treat, then mechanical engineer of the Joliet Steel Company, put in a set after his designs at their Joliet, Ill., mill. He was assisted in this by Charles Pettigrew, the company's chief engineer. Wm. Clark of Pittsburgh also developed a table system. While there have been great changes in the various companies' mills the table designs are all based on the original schemes.

The Evolution in Rail Steel.

There would not have been the increased steel production in America if it had not been for the development and growth of the country, and it is also true that without the discovery and expansion of the making of Bessemer and other mild steels that growth would have been impossible. While the present American railroads with their equipment would be absolutely impossible with iron rails it is also true that their development has necessitated a change in the characteristics of the steel rails used. In the early seventies, when steel began to replace iron rails, the section required was not over 60 and more generally 56 to 58 lb. to the yard, and the increased service obtained from them was regarded as wonderful. Nevertheless, the wisdom of their use was not at once unanimously accepted. If I am not mistaken one of the leading English technical journals for a long time warmly championed the continued use of iron rails. Naturally the term steel carried with it an idea of hardness and consequent brittleness, hence the fear of an all-steel rail. Much time and money were spent in unsuccessful experiments with iron rails having steel heads. These conditions led to making the steel rails of as soft a composition as could then be successfully accomplished. I have no doubt that had ferromanganese been then known the early rails would have been rolled from dead soft metal. Be this as it may, it is true that while the early steel rails were of very irregular chemical composition the aim was to keep the carbon content not to exceed 0.30 per cent., and somewhat later not over 0.40 per cent. Undoubtedly owing largely to the care exercised in the physical treatment of the metal during the manufacture of the rails most excellent results were obtained, and gradually familiarity with them dispelled the fear of breakage. It was not long before railroad officials realized that their use permitted increased loads and

speed. Traffic demands and better financial conditions led to increasing the weight of the rail sections and also the hardness of the metal in them, but the same causes also led to heavier wheel loads of both engines and cars and to faster schedules. In many cases the results as to wear were not satisfactory, which led to a notable discussion, which is recorded in the *Transactions* of the Institute, Vol. XX. The advocacy of softer steel came from one of the leading railroad systems of the country, ably presented by their chief chemist, then as now a distinguished member of the Institute. This resulted in a demand for lower carbon steel, which continued for several years. But the results were not as anticipated. The increase of wheel loads, total tonnage hauled and speed of trains went on, and harder steel won the day and has since been in universal use on American roads. But the enlargement of elements was not all on the side of the railways. The rail makers had also been busy, and some persons claimed and still contend that speed of manufacture did not tend to give better results under stress of traffic. Let that be as it may, it is a fact that American railroads now require very much harder rails than do those of Europe, and this regardless of the climatic conditions under which the rails are to be used. In fact, thousands of tons of 80 lb. rails with carbon content to the height of American specifications have been and are in safe use on Canadian roads, some of them made on this side of the water, some in the United States and others in Canada.

Basic Open Hearth Rails.

The increase in the output of basic open hearth steel has been great in the United States, but it was not until 1890 that the commercial manufacture of rails from that metal was begun. This was done at the Ensley, Ala., works of the Tennessee Coal, Iron & Railroad Company, and since then that company has regularly continued the manufacture. The Colorado Fuel & Iron Company, at Pueblo, Colo., has begun the manufacture of basic open hearth rails on a large scale. The entire rail output of the Dominion Iron & Steel Company, Sydney, Nova Scotia, is also of that metal, and the Indiana Steel Company, a subsidiary company of the United States Steel Corporation, has started upon the building of a large plant for the same purpose. Aside from the comparative merits of Bessemer and basic open hearth steel there seems to be no doubt that America's iron ore conditions will force the growth of the latter process. The total of 188,264 tons of basic open hearth rails rolled in the United States in 1905 is small as compared with the Bessemer tonnage, but it is the handwriting on the wall. There have been two attempts to make steel in America by the basic Bessemer process. Both were technically successful, but owing to the character and cost of the iron obtainable they failed commercially.

While so far the output has covered but a moderate tonnage, at the same time the successful results obtained demand that mention be made of the McKenna process of renewing worn rails. The American McKenna Process Company owns three mills, but at present only one of them is in operation. It is at Joliet, Ill., and has been continuously successful. As you will recall, the procedure is to take worn rails, heat them in long furnaces and give them while at a comparatively low temperature two passes in a tandem mill. The reduction varies with the condition of the worn section, but as a rule gives a rail of about from 10 per cent. to 12 per cent. lighter weight than the original section. This practice has been in operation since 1897 and a number of the leading Western railroad systems are regularly employing it with satisfactory results.

Large Blast Furnace Outputs Necessary.

While I have given precedence to the American development of Bessemer and open hearth steels, particularly as intended for rails, it was because, as stated, that history has been so coincident with that of our Institute. But it has not been on those lines alone that the United States has made great progress. In fact, it was necessary to such production of steel that increase in the blast furnace output should at least keep pace with it. It will be recalled that European and American ironmasters differed for a long time as to the economy of forcing the

workings of blast furnaces, the former contending that while the output would be augmented, so also would the cost of repairs. On the other hand, the Americans maintained that it was as to the tonnage and not as to time that such cost should be figured; that is, if a furnace lining gave 100,000 tons of metal and lasted but a year in so doing it was cheaper thus to use the plant than to take three years in obtaining the same product. At all events it has been on the latter lines that the business has been conducted. But, as in many other cases, we had to come to England for that which has made such driving possible. Without the fire brick stoves it could not have been accomplished. They may have been improved, and other names deserve honor for what has been done, but that of Whitwell will ever stand as the foundation one.

The production of pig iron of all kinds in the United States in 1876 was 1,868,961 gross tons. In 1905 it was 22,992,380 gross tons. The production of Bessemer pig iron was not separated statistically from other pig iron until 1887. In that year it was 2,875,462 gross tons, and in 1905 it was 12,220,209 gross tons. The production of basic pig iron was first separately ascertained in 1886, when it was 336,403 gross tons. In 1905 it was 4,105,179 gross tons, charcoal basic pig iron not being considered in either case.

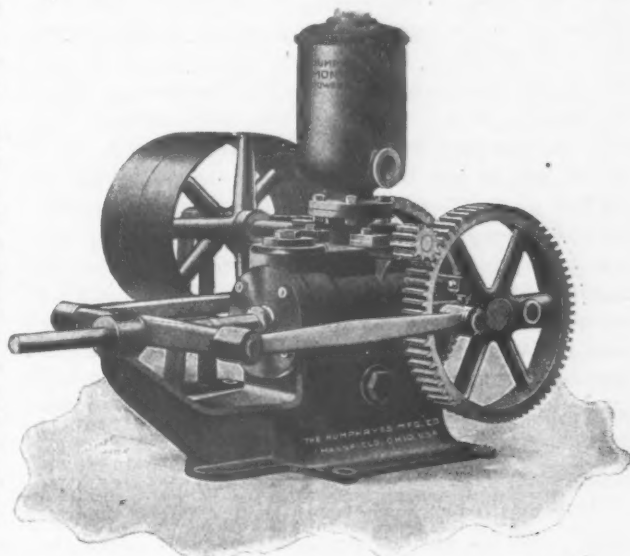
Undoubtedly the use of the Jones scheme of a mixing receptacle has done much to permit the driving of the blast furnaces supplying steel plants. The output of several furnaces being so treated, it is readily seen that greater variation can be permitted in its character than if the iron from each one had to be used separately. But while furnaces have been driven to making an output of over 750 tons per day apiece, I believe it has been concluded that better results are obtained by limiting the output of the same furnaces to about 550 tons in 24 hr. Of course, the tremendous outputs would be impossible if the raw materials, and in fact the produced metal, were not handled by machinery, much of which is of automatic character. Such devices do not merely move the stock, but some of them also regulate the charging and distribution of it in the furnace, and contribute to the regularity of the metallurgical process. In that field there has been much mechanical ability applied, and improvements are still being diligently sought. Next to the use of gas blowing engines, for which we must thank this hemisphere, I suppose the development in blast furnace practice which is attracting the most attention in America is our Past-President James Gayley's application of refrigeration, to the blast, the results from which are certainly very encouraging, and I am glad to know that its use is being taken up by other concerns than his own.

There are many other developments in iron and steel manufacture in the United States which deserve recognition, and I feel derelict in failing to mention any one of them, but time must limit my address. American members of the American Institute of Mining Engineers know of them. Our foreign members and our hosts of the Iron and Steel Institute must come to the United States and see for themselves. They may not want to copy, but they can at least see what to avoid.

Owing to the developments of the Japanese sea force and the lead of England in the matter of battleship construction of great size, other nations are joining in the race for supremacy in the single battle unit. The English type ship Dreadnaught is of 18,500 tons displacement. Japan is building two, in native dockyards, of 19,000 tons each. Germany has two of 19,000 tons under contract. France has taken steps looking to the acquisition of six of 18,000 tons each. The United States has one under authorization to displace probably 20,000 tons. At present writing there seems to be little disposition to limit the size of new constructions; the whole tendency is a reaching out into new fields of size and character, a general disposition to relegate medium sized guns to the scrap heap being the most prominent individual characteristic of the new ships. Speeds are being raised above those of previous types, which multiplies largely the construction of each unit.

The Monitor Horizontal Power Pump.

The new horizontal double acting power pump here-with illustrated has been designed with special regard to durability, capacity and accessibility by the Humphries Mfg. Company, Mansfield, Ohio. It is built very compactly and is claimed to require less floor space than any other pump of equal capacity and power. The construction is stated to be such as to relieve the cylinder head of all strains, so that high pressures may be pumped against without leakage around the head or failure of the parts. Suction may be taken from either side and the discharge turned in four directions. Unnecessary friction in the guide and stuffing box is avoided by insuring perfect alignment of the guide and cylinder by boring both at the same setting. The valves and plungers are very accessible, it being necessary only to take off four nuts and remove the front head to permit the bottom valve to be examined and the plunger to be taken out if desired. The back valves are examined by removing the pins from



The Monitor Horizontal Power Pump Built by the Humphries Mfg. Company, Mansfield, Ohio.

the links and taking out four bolts, when the main gears may be removed.

Attention is called to the placing of the bearings on this pump, the aim having been to distribute the strain so as not to destroy the efficiency of the packings and so cause the suction to be lost. Another feature of the design with respect to the bearing strains is the provision for taking them upon the main casting instead of the minor parts of the pump. Particular stress is laid on this point by the manufacturer, as it has much to do with the rigidity and therefore the long life of the pump.

The pump is fitted with brass lined cylinder, spring actuated rubber valves, Babbitted bearings and brass encased piston rod. The gear reduction is 5 to 1, transmitted through steel machine cut pinions. The pump has a capacity of 2000 gal. per hour and is referred to as one especially adapted for use with gas and gasoline engines.

The report of the committee on a railroad connecting North and South America appointed at the Pan-American Conference in Mexico in 1902, has been submitted to the Pan-American Conference at Rio Janeiro. The committee considers that a railroad 10,400 miles long to connect New York with Buenos Ayres is feasible. Railroads already in existence or projected could be utilized, and it is reckoned that not more than 3700 miles of intercontinental railroad is not specifically provided for. This is divided as follows: Peru, 1200 miles; Ecuador, 450 miles; Colombia, 845 miles; Panama and Central America, 1200 miles. The route proposed is through Mexico into Central America, and along the slope of the Andes into Argentina. Branches to the seacoast, where the road runs through the interior, or into the interior, where the main line follows the coast, are contemplated.

THE IRON AGE

1855—1906.

New York, Thursday, August 16, 1906.

DAVID WILLIAMS COMPANY,						PUBLISHER
CHARLES KIRCHHOFF,						EDITORS
GEORGE W. COPE,						
A. L. FINDLEY,						
RICHARD R. WILLIAMS,						
						HANDWRITER

Significant Pig Iron Statistics.

Figures have been marshaled so frequently to express the astonishing performances of the American iron trade that it seems at times that they had lost their ability to impress upon the mind the real significance of what has been accomplished. In connection with the statement of pig iron production in the United States for the first half of 1906, given in *The Iron Age* of August 9 from the statistics of the American Iron and Steel Association, it was said that the total exceeded the greatest record for any single year preceding 1899. That means that in less than eight years the production of pig iron in the United States has been doubled. Really, the distinction of having exceeded the production of the best year previous to 1899 belonged first to the second half of 1905, as will appear in the statement below of pig iron production in the last three six-months' periods, compared with the full year 1898, the greatest year's production previous to 1899:

	Gross tons.
First half of 1905.....	11,163,175
Second half of 1905.....	11,829,205
First half of 1906.....	12,602,901
Calendar year 1898.....	11,773,934

Moreover 1898 showed more than 2,000,000 tons increase over the greatest previous year, 1897, when the production was 9,652,680 tons. It will be recalled that 1896 was a lean year, the production falling from 9,446,308 tons in 1895, the year of the little boom, to 8,623,127 tons. It would thus appear that 1906, with a probable production of about 25,200,000 tons, will nearly treble the output of 10 years ago, quite outdoing the traditions of the trade which call for a doubling of pig iron output every 10 years.

Taking the figures the American Iron and Steel Association has just gathered in connection with those for the two six months' periods in 1905, they show what may not have been appreciated in all quarters—namely, that the increase in production has been all in steel making irons, while the production of foundry and forge irons has stood still. The computation takes this form, the figures given being gross tons:

	First half of 1905.	Second half of 1905.	First half of 1906.
Bessemer pig iron.....	5,985,148	6,421,968	6,899,066
Basic pig iron.....	1,966,592	2,138,587	2,449,275
Spiegel and ferro.....	125,334	164,649	160,833
Total steel making iron.	8,077,074	8,725,204	9,509,174
Foundry and forge.....	3,086,101	3,104,001	3,093,727
Total production.....	11,163,175	11,829,205	12,602,901

It will be seen that with the exception of 7626 tons, or about one-half of 1 per cent., the entire increase of 1,439,726 tons in the first half of 1906 over the first half of 1905 has gone to steel works. It is probable that in no other three half-year periods has the production of foundry and forge irons been so evenly maintained. Statistics are not available to indicate the distribution as between foundry (including malleable Bessemer) and forge irons for the three periods, though this was made up for the entire year 1905. But it is current history

that in the South more basic and less foundry iron was made in the first half of 1906 than in the first half of 1905—267,379 tons of basic in Virginia and Alabama against 201,524 tons. The activity in malleable works would justify the assumption, moreover, that malleable Bessemer has been increasingly in use. It is safe to say, too, that with poorer coke on the average and with poorer working of furnaces, in the effort to keep them running past the time when they should have been re-lined, more lower grade iron has been made proportionately in the past six months than in either of the preceding six months' periods. The probabilities are therefore that the make of foundry and high silicon irons has been decreasing. Some relief will come, however, from new furnaces building at Josephine, Midland and Erie, Pa.; Mayville, Wis.; South Chicago, Ill.; Toledo, Ohio, and Gadsden, Ala.

Germany Second the Steel Corporation Policy

The German Steel Verband has followed the example of the United States Steel Corporation in using its strength for the prevention of such price advances as may invite reaction. In the latter part of July the syndicate managers refused to make a further advance of 5 per cent. in the price of billets, sheet bars, slabs, skelp and other "half rolled" material, though an application for the advance had come up from the membership, and it was generally believed in the trade it would be granted. In their statement announcing the action the managers argued that moderate prices are the best guarantee of the continuance of prosperous conditions, and that it was as much the mission of the syndicate to curb a tendency to too rapid advances in times of activity as to maintain a fair level and prevent demoralization and excessive reaction in times of slack demand.

The problem of the right price—the price at which free consumption will continue, with a profit to the manufacturer proportioned to the existing level of raw material costs and to the extent to which labor is finding employment and remuneration—is one of the most important that arises where any measure of control is possible to producing interests. The history of the pools that have flourished for a time and then gone to pieces is an interesting chapter in the record of the iron trade of the United States. The disease of all was the inevitable proclivity to break faith before some one else had a chance; but the occasion for its assertion was almost always furnished by the light to which prices had been pushed when control of the situation seemed best assured. On the other hand, some of the most disastrous upward movements in prices in the American iron trade have taken place in lines in which no control was asserted by producers. The pig iron movement of 1899 and that of 1902 are cases in point. These represent the reverse of that form of reaction which the steady policy of the United States Steel Corporation and of the German Steel Verband is intended to prevent. In each of these cases the sharp upward movement had been preceded by a period in which competition had worked against industrial expansion.

It will be interesting in the present state of the iron trade to follow the working out of the moderating forces that spring from the existence in the two leading iron producing countries of powerful organizations. In the United States the commanding influence proceeds from the world's greatest corporation, in which all the elements in iron manufacture are integrated. For better or for worse it is a permanent factor in the iron trade of the country. In Germany the organization that to a large ex-

tent will shape market policy is temporary and has not yet been subjected to the disintegrating influence of a period of depression. What the United States Steel Corporation was able to do in 1904 in saving the domestic situation from even approaching distress has perhaps not been fully appreciated. But that record and the present attitude of the Steel Corporation and the German Steel Syndicate, each in its own sphere of influence, give some measure of assurance against the time when clouds shall gather again in the industrial skies. It may be inferred, moreover, that the days of slaughtering competition between American and German steel makers in neutral markets, which have been treated by some writers as inevitable, even though not imminent, may not have all the terrors that have been promised.

Gas Washing for Blast Furnace Engines.

It was very pertinently remarked in a discussion at the recent meeting of the Iron and Steel Institute in London that Americans recognize that the chief point about the use of blast furnace gas engines is the matter of cleaning the gas. There was a world of meaning in that brief comment. The building of very large engines or of machinery of any description is so readily and successfully undertaken in American shops that when the demand for large gas engines came lately no difficulty was found in building them. All investigation goes to show that the chief difficulties experienced abroad in the 10 years spent in bringing the blast furnace and coke oven gas engine to a thoroughly commercial basis have been in the matter of cleaning the gas.

That desideratum has now been reached, at least as regards air conditions met abroad. It was stated in one of the formal papers on the gas engine presented at the institute meeting, the one from Germany, that the dust in blast furnace gas was reduced to from 0.02 to 0.03 g. per cubic meter, and in the British paper that blast furnace gas was being cleaned to 0.002 g. per cubic meter. Oral confirmation of this was given in the discussion from another source, it being stated that notes taken from actual practice showed consecutively 0.0025, 0.0026, 0.0033, 0.0037, 0.0024, 0.0024, 0.0019, and so on. The meeting being held in London, it was remarked that this was probably a degree of cleanliness exceeding that of the air the members were breathing at the very moment.

Americans have not always allowed the pioneer work to be done abroad, but they have done so distinctly in the present instance. There is left some work for them to do, however. It is unquestionable that the adoption of large engines using blast furnace gas in the United States will be rapid from now on, and further work will probably have to be done in the matter of gas purification, chiefly from the difference in the character of the ores used. In any event, the statements just made at the London meeting regarding the quantity of water required for purification will probably be taken with much reserve by American engineers who have looked into the subject. One of the papers mentions "less than a liter" of water per cubic meter of gas, and another 0.8 to 1.5 liter. Four years ago an American engineer on a tour abroad made a special investigation of this subject. He was met with about the same claims as are now put forth, but found on actual investigation that the consumption was very many times the amount claimed.

At some centers of American iron production water is scarce, while at others the supply is boundless. Before the operation of so many blast furnaces in the Monongahela Valley the river, being slack watered, used frequently to freeze across. The phenomenon is now prac-

tically unknown, and the change has been wrought mainly through the discharge of hot bosh water. The trend of iron production in the past few years has been distinctly toward the lake front, where the question of water supply can hardly arise. The two notable instances of blast furnace gas engine installation at the present time are in connection with plants built and building on the lake front—those at Buffalo and Gary. The selection of sites which afford the economy of unloading ore directly into the furnace yard also meets perfectly the requirements of gas washing.

Men are prone to measure the future with an ephemeral yardstick. The recent excitement regarding the future of Great Britain's coal supplies was an instance, and another has been the uneasiness regarding the world's supply of iron ore. The wiping out of a measurable proportion of coal consumption per unit of achieved result, as is being accomplished by the waste gas engine in a period of a few years, is an illustration worth noting of the futility of gauging future requirements. Our coal supplies may be larger than our iron supplies, but no one has ventured thus far at least to speculate on the return of the carbon in carbonic acid to useful employment, while the utilization of iron and steel scrap is a regular operation.

Consolidating Public Power Plants.

The consolidation of lighting and power companies of small cities and towns is becoming a more frequent occurrence. The greater economy of large stations for generating electricity and illuminating gas is given as the chief reason, although of course those who promote such consolidations by no means lose sight of the usual financial accompaniments inuring to their benefit. In many instances, however, the consolidation has been productive of some good results to the consumer in the lowering of charges for the service rendered in supplying light and power. Many small places have been supplied with these forms of public service within the past few years, each with its own plant, because of the development of combustion engines, of electrical generating equipment for use with water powers of small head and of new illuminants, especially acetylene gas. But usually the cost of the gas or electricity to the consumer has been much higher in such localities than in those having large central stations. By consolidating the electric and gas generating plants of a number of small places located within a limited area prices of the product must naturally fall, for the same reason that prices are lower in large places. Another influence is also operative in these days in the remarkable uprising of the public against high charges made by public service corporations. If consolidations do not result in cheaper service some method of compulsion is found.

Investigations into the effect of high temperatures upon the tensile strength of steel have been made in England. In an especially designed furnace, arranged for the purpose and calculated to give temperatures up to 800 degrees, test pieces measuring 0.2 in. in diameter and 4 in. long were placed and loaded with a weight of 88 lb. The temperatures were measured by thermo-couples at each end and the center, and the elongation by a Ewing extensometer graduated to 0.00002 in. The experiments showed that as the temperature rises the elastic properties of the steel become sluggish in their manifestations, the material behaving at high temperatures like India rubber or glass. If it is for a time subjected to a stress, which is then removed, it does not wholly recover at once, but after the first partial recovery there is a slow completion of the process, lasting for several minutes.

The Lake Superior Mining Institute.

Twelfth Annual Meeting.

The 1907 meeting of the Lake Superior Mining Institute will doubtless be held at Duluth and the Minnesota ranges. It will be five years since the institute visited the Mesaba and Vermillion districts, and it has become its habit to make the various mining regions about the lake quinquennial visits of inspection. Thomas F. Cole of Duluth, was unanimously elected president of the institute for the ensuing year, itself an assurance that the 1907 meeting will be carried through with an *eclat* and precision highly commendable and that every arrangement for the comfort of members and for the fullest understanding of the entire situation will be afforded.

About 250 members of the institute gathered at the Douglas Hotel, Houghton, Mich., on Wednesday morning, August 8, for its twelfth annual meeting. On arrival the members were presented with a full programme of the sessions, together with abundant maps, both of the Michigan copper region in full and of the Houghton section in particular, and with a brief but complete description of the district and its mines.

At the annual business session the following were elected for the coming year: President, Thomas F. Cole of Duluth; vice-presidents, D. T. Morgan of Republic, D. E. Sutherland of Ironwood, and N. W. Halre of Houghton; managers, J. W. Amberg of Chicago, Pent Mitchell of Duluth, J. C. Greenway of Coleraine, Minn.; secretary, A. J. Yungbluth of Ishpeming; treasurer, E. W. Hopkins of Commonwealth, Wis. Papers were read in accordance with the programme printed in *The Iron Age* of August 2. Messrs. Yungbluth and Hopkins were given an especial vote of thanks for their services for years past. The financial statement showed receipts for the year of \$2395, expenditures \$1638, cash on hand at the close of the year \$4396. During this session 57 applicants were admitted to membership. The total membership of the institute is now 465, making it the largest association of mine operators, managers and owners in the country, aside from the American Institute of Mining Engineers. Among those present there was not an unusual proportion of local people, and the attendance was perhaps more general than has been the case at any session since that on the Mesaba range in 1902. Among those present were many who have attained national prominence in their professions.

In the five years since the institute met there the copper district has expanded and has changed in character materially. While the district in 1901 produced 155,604,600 lb. of copper, it is now hoisting rock for an annual production of about 230,000,000 lb. This is due not at all to a higher grade rock, for there has been a diminution of copper content in some of the larger mines, even to the largest shipper, but to the tremendous tonnage now handled. Five years ago the institute visited the works of the Baltic, Trimountain and Champion mines, south of Houghton. They were then in initial stages, Trimountain being a mere exploration. To-day the group is second in production only to Calumet & Hecla. There has been a similar development though in less extent on the Kearsage lode, further north. On the extreme end of Keweenaw Point, then a wilderness and so slightly regarded that no work was even in consideration, there are now many drills, several shafts in progress, and vast ownerships of mineral tracts have been consolidated under Calumet and Hecla and T. F. Cole control. Then the Michigan Smelting Company was not in existence; to-day it has an annual capacity for 60,000,000 lb. of refined copper and has one of the most modern metallurgical works of the world, embodying devices for saving labor and excellence of operation not excelled anywhere. Then the Michigan College of Mines was in what might be termed a formative state, though it had done much excellent work and was far advanced among the schools of the country. It has grown greatly since, both in its physical equipment and in the character and scope of the education given.

On Wednesday members of the institute took a special train for Calumet, where the afternoon was passed, mostly about No. 5 Tamarack, Red Jacket and No. 4 Calumet shafts. The former was interesting on account of the hoisting plant, a great four cylinder Nordberg of tremendous power lifting 6-ton skip loads of copper rock. The hoisting plant is in duplicate, consisting of two 6500-hp. engines with conical drums varying from 16 to 24 ft. diameter. This is a vertical shaft 5080 ft. deep and is one of the most interesting ever sunk. It has been quite fully described in previous proceedings of the institute. Red Jacket shaft is 4900 ft. deep and its surface equipment is quite remarkable. Close to these two is another one of the three deepest shafts in existence, being No. 3 Tamarack, bottomed at 5200 ft. It was not visited. The party took in the Superior power house of the Calumet & Hecla Company and inspected with much interest the beautifully finished engines there, having a combined horsepower of 15,000. None of these mines were descended.

Northerly mines, Mohawk, Ahmeek, Allouez and others, were inspected, and at Wolverine some of the party went underground for a brief stay. Of the entire visit of the institute not much time was spent underground, for most of the mines were closed to visitors, nor at mills, for it was considered by the local committee that an inspection of one typical mill, such as the Baltic, was sufficient.

On the next morning the south range region was inspected, the party beginning at Redridge, visiting the Baltic mill and the great gravity steel dam for the various associated companies there. At the time of the last session of the institute held in the copper country this dam was in its initial stage of construction, and of a type that was then considered somewhat of an innovation. It has been a success. The Champion and Baltic surface plants were examined. On this day, too, the Calumet & Hecla stamp mills at Lake Linden, where preparations for very complete electrical equipment were to be seen, were visited by some of the members. Others went to the Globe shaft of the Copper Range, south side, where 250 ft. of soft overburden was cut in the shaft. The Calumet stamp mill is now running by motors from one large generator, placed in a new power house where there is already installed 10,000-hp. equipment in four generators. But transmission lines and machinery at the mine is not yet ready, so only a small amount of power is transmitted there as yet. In this connection it is interesting to state that the question of electric hoists is being taken up very energetically and it is probable that in the comparatively near future there may be installed here the first deep mine hoist of large capacity driven electrically.

The demolition of the old single track iron swing bridge over the River Yare in England and the erection of a new double track bridge of the same type in its place were accomplished within the space of 36 hours. Just before midnight (a Saturday night) the work of removal was begun, and by daybreak was largely accomplished. The large main girders were lifted from their seatings by means of cranes placed on both sides of the river. The last vestige of the old bridge was out of the way shortly after noon on Sunday. Huge timbers were then placed in position and rails laid upon them and the navigation section of the new bridge, already constructed, was rolled into position. This required 10 minutes. In a similar manner the counterpoise half was placed. By daybreak on Monday the work had been so far completed as to permit the resumption of the regular train service. The bridge swings from the middle for the passage of river traffic. It will be opened by electricity, the operation requiring 90 sec. The length is 150 ft. and the total weight of the swinging section and two stationary end sections is about 200 tons.

The steamer William G. Mather established a new record recently for ore cargoes arriving at Buffalo, N. Y., in carrying 10,525 gross tons of ore for the Lackawanna Steel Company on a draft of 19 ft.

The Foundry Strike Situation.

The officers of the National Founders' Association have issued a statement of conditions existing at the more prominent foundry centers at which strikes were declared by the Iron Molders' Union in April and May of this year. In a few cases the strikes are of more recent date, as at Barberton and Columbus, Ohio; Plainfield, N. J., and Port Chester, N. Y. It is stated that at its recent meeting in Detroit the Administrative Council of the National Founders' Association decided that it was not necessary to use any of the reserve fund which the association has been accumulating for years. The Executive Board of the Iron Molders' Union at a meeting in Cincinnati recently is reported to have levied an assessment of \$5 per member to defray the expenses of the strike. The other special assessment for the present strike was levied in June, and was for \$3 per member—\$1 for each of the weeks ending June 30, July 7 and July 14.

Molding Machines and Increased Output.

Reports from a number of centers indicate that the output of foundries has been increased where molding machines have been installed and special attention has been paid to the instruction of handy men. In one case the extraordinary increase of 100 per cent. was reached. At another plant the increase was 40 per cent. While these are known to be exceptional cases there are many reports of better results than under the former régime. Commenting on the general situation, the foundrymen's circular says:

The National Founders' Association was not organized to disrupt the molders' union, nor has it ever attacked that organization. But its existence and constant and steady growth have been the necessary consequence of unjust and un-American demands of radical unionism. The effort of the union officials to disintegrate the National Founders' Association has signally failed.

Realizing the impossibility of securing sufficient competent molders the foundrymen are continuing the policy of breaking in new men and enlarging the scope of the molding machine. Outbreaks of violence in Chicago, Columbus and elsewhere seem to indicate that the disorderly floating element of the strikers is growing impatient at the steady and determined resistance of the foundrymen who are carrying out the consistent policy of the National Founders' Association. But there is now no expectation or holding out for the closed shop agreements that were demanded at the outset of the strike.

The foundry of the Wellman-Seaver-Morgan Company at Akron, Ohio, is being successfully operated with independent molders, and at the nearby town of Barberton the Stirling Consolidated Boiler Company is making good progress.

The output of the Beloit, Wis., foundries is practically as large as before the strike, the employers having installed a large number of molding machines.

The strike at the plant of the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., began on May 28, 1906, the molders demanding the abolition of piece work, a reduction in hours from 10 to 9, and an increase in the minimum wage. On July 30 the strikers returned to work, no shop agreement having been signed by the company, and it is stated that none of the demands of the men were granted.

At Buffalo, N. Y., the 11 foundries which have declared for the open shop are successfully operating, and it is stated the molders concede this. Efforts have been made at a number of shops to secure the reinstatement of the striking molders.

Sixteen Chicago foundries, employing over 600 men, are now operating as open shops.

The demand of the union at Columbus, Ohio, was for an increase of 25 cents a day with a signed agreement, and 288 men went out from nine foundries. Four small foundries agreed to the advance. The nine firms are making good headway and have published in the daily papers their determination to abolish shop committees and union restrictions. There has been some violence, and in one instance a foundry was broken into by the strikers, who did great damage to the plant and assaulted the bookkeeper.

The Pratt & Whitney Company, Hartford, Conn., has

secured nearly a full complement of men, and has announced that it will not deviate from its long standing practice of operating an open shop. The strike was due to the refusal of the company to recognize a shop committee and to abolish piece work. No molder has been asked to work by the piece in this foundry unless he desires to do so.

Handy Men Replace Skilled Molders.

The Milwaukee foundrymen are continuing with success the work of instructing handy men and helpers, and the output has reached surprising proportions. As against 24 molding machines in use at the beginning of the strike there are now 154. At the instance of the Vilter Mfg. Company of Milwaukee a temporary injunction has been issued restraining three molders' unions and 35 individual members of the unions who are on strike from picketing, obstructing or otherwise interfering with the business of the Vilter Company. The complaint upon which the injunction was issued contained practically the same allegations regarding threats and intimidation of nonunion men as were incorporated in the complaint of the Allis-Chalmers Company restraining similar defendants.

The 10 shops in Philadelphia involved in the strike of October, 1905, are all running with nonunion men, and there has been no change in the determination of the foundrymen to continue on the open shop basis.

The strike of 90 molders and coremakers of the Carondelet Foundry Company, St. Louis, on July 26, 1906, followed their refusal to work on patterns from struck shops. They presented a demand for a nine-hour day, a \$3 minimum for coremakers and the recognition of a shop committee. Several other foundries on which the same demand was made have also refused it.

The seven leading foundries in Scranton, Pa., employing over 160 men, are maintaining open shops after refusing to sign an agreement for a 9-hour day with 10 hours' pay.

At Minneapolis and St. Paul 17 firms are conducting open shops, and a good increase in output has been reported.

Three Springfield, Ohio, piano plate shops are resisting the demand made in May for an advance of 25 cents per piano plate, afterward changed to 15 cents, and a nine-hour day. It is stated that the real issue is believed to be an attempt by the union to abolish the prevailing custom of having a helper with each molder on this class of work. The O. S. Kelly Company has published a notice of its intention to operate an open shop.

The successful conduct of their shops is announced by operators in Nashua, N. H.; New Orleans, La.; Springfield, Mo.; Toledo, Ohio; Topeka, Kan.; Hazleton, Pa.; Kansas City, Mo., and Kansas City, Kan. The large foundry at Indian Orchard, near Springfield, Mass., is reported to be operating successfully with independent molders. Abendroth Brothers, Port Chester, N. Y., who had 96 men in place of 135 strikers in their stove foundry three weeks after the strike was declared, are now running with practically a full force. The original issue was a shop custom, and the firm acceded to the men's wishes. Then the question of recognition and of shop committee came up and the demands on this score were refused.

In the Australian House of Representatives on August 10 Sir William Lyne, Minister of Trade and Customs, announced that the import duties on stripper harvesters, plows and disk cultivators had been raised from the present duty to 12½ to 25 per cent. He added that provision had been made that, if the selling prices of similar machines made in Australia were raised above the prices of 1905, the collection of the additional duty might be suspended.

The Dominion Wire Mfg. Company, Limited, Montreal, Canada, will erect an open hearth steel plant, a blooming mill and a combined rod and merchant mill. The improvements will cost \$500,000. The open hearth plant will be the first to be built in Montreal.

The Indiana Steel Company's Rail Mill.

CHICAGO, August 14, 1906. — (By Telegraph.) — The contract for the erection of the rail mill, including cooling beds, transfer tables, hot and cold pull-ups and a large electric shear, for the Indiana Steel Company, Gary, Ind., has been awarded to the United Engineering & Foundry Company, Pittsburgh. The mill is designed for a greater output than yet attained by any similar mill and will have an estimated capacity of 75,000 tons a month, or 900,000 tons a year. It will be the first mill in the North to operate on open hearth steel exclusively, the initiative in this practice having been taken by the Tennessee Coal, Iron & Railroad Company in the South with marked success. Likewise it will be the first electrically driven standard section rail mill in the world, and all of the auxiliary machinery will be operated by this power.

It will consist of five stands of 40 in. roughing rolls and seven stands of 28 in. finishing rolls, two of which will be three high and the remainder two high, requiring 18 passes from the ingot to finish the rail. This mill will be located about one-half mile from the power house and will consume approximately 10,000 kw. Three cables will transmit the current at 2300 volts. The stands for reducing the ingots will be driven by two 2500-hp. motors, and the blooming stands will be operated by a 6000-hp. motor. Two 4500-hp. motors will propel the intermediate stands of rolls, and the finishing rolls will be driven by a motor of 2250 hp. capacity. The contract for the electrical equipment has been awarded to the Allis-Chalmers Company, Milwaukee. The roll housings will be cast iron with steel caps. It is intended to have the mill in operation in January, 1908. The mill building, which will be of exceedingly heavy construction, requiring approximately 18,000 tons of steel, is now being designed.

The Condition of the Statue of Liberty.

BY S. D. V. BURR.

Persistent rumors have long been afloat that the Bartholdi Statue of Liberty in New York harbor is in a weak condition and liable to collapse without warning. According to these reports the salt atmosphere, working in harmony with electrolysis, has so injured both the shell and its supporting steel frame that the destruction of the figure may take place at any moment. A close examination, however, fails to reveal any undue weakness in the structure, either in the foundation, steel work or copper shell. That the statue has a disreputable appearance, which is enhanced as the view becomes nearer, cannot be gainsaid, but, as in many other instances, this is no indication of a corrupt character within.

The surface of the statue is gradually assuming a verde antique tint, a color that is now very popular as a finish for copper. But with the processes at present at work the color will never be evenly distributed. The surface is best described as being ringed, streaked and striped, and even at a distance it is evident that the colors were laid on with too broad a brush, and further, they are not in harmony unless one approves of a mixture of iron rust and verdigris.

The figure is covered more or less with a green patina except the back, which from the shoulders down is almost free. All down the side under the uplifted arm are heavy rust marks mixed with the green. From the left shoulder down the front nearly to the waist are the red rust marks. The back of the tablet is a dull copper color, while the front is evenly coated with light green and is by far the best specimen of coloring in the entire figure. The face is copper color with the exception of part of the left cheek, which is streaked with green. The left knee is marked with iron rust. Looked at in front the left side of the robe is green while the right is dull copper. All the horizontal seams and some of the vertical ones show plainly from quite a distance. The inside is practically covered with rust.

The holes in the copper shell are very few considering the great size of the statue, and practically all are in the

body of the sheets and not where the image joins the framing. The shell is secured to the frame, not by riveting direct metal to metal, but by a strap system. Whenever the shell approached close enough to the frame to permit it a strap of copper was placed around the frame member and the ends were riveted to the shell at each side. The holes appear to have been caused by impurities in the copper rather than any action similar to electrolysis. The seams are all lap riveted except where it was absolutely necessary to preserve an unbroken surface, as in the face.

The shell is made of $\frac{3}{8}$ -in. copper in as large sheets as could be handled. The supporting frame in the figure proper consists of four built-up corner posts, united by horizontal and diagonal members. The frame is provided with side extensions according to the contour of the figure. The shell is tied to the frame at short intervals, so that it is not self-supporting and there is no danger of buckling or distortion. This truss work was designed by M. Eiffel of tower fame.

The statue is anchored to the pedestal in a very simple and efficient way, the design of which was worked out by C. C. Schneider, at present consulting engineer of the American Bridge Company. Extending across the top of the pedestal are six channels, 4 ft. deep, arranged in sets of three each, placed under the corner posts of the frame of the statue. Just beneath these and at right angles to them are two other sets of three each. All these are long enough to span the well hole and enter the masonry $3\frac{3}{4}$ ft. The base of each post and the channels are tied together by three bolts $5\frac{1}{2}$ in. in diameter. This makes provision for the support of the dead weight of the statue, but does not anchor it against the overturning effort of wind pressure.

A little over 60 ft. beneath the top of the pedestal is a second set of girders similarly arranged and having their ends embedded in the masonry. The two systems of girders are united by four sets of eyebars placed as near the side walls of the shaft as possible. Each bar is 4 in. wide by $1\frac{3}{4}$ in. thick. At the top these bars are extended to connect with the main frame at the tops of the first and second panels. In this manner the frame carrying the shell is fastened to the base and provision made for resisting wind pressure.

How much the entire framing has been injured by rust can only be ascertained by a minute examination of the whole structure. That corrosion has progressed so far as seriously to affect the strength of the structure is not probable, since the metal was well protected at the time of construction. But the impression that seems to prevail that the statue will last indefinitely because it is made of copper is an exceedingly dangerous one. With the appropriation made by the last Congress the entire work will be thoroughly overhauled and the metal surfaces protected wherever needed.

The proposition to paint the outside of the statue has been received with marked disapproval, particularly by artists, who are enthusiastic over the greenish cast that the surface has acquired. But this color is in blotches and under present conditions time will not remedy that fault. The image will be carefully cleaned, but it is not likely that it will ever be painted.

A turbine has been patented in England which, by means of two sets of steam admission ports, into either of which steam may be admitted at will, it is claimed will give two different speeds of operation at the same efficiency. For the higher speed the steam is conducted from one set of ports through expanding nozzles to the rotor, where it encounters two sets of moving blades and one set of fixed blades, passing thence to the exhaust. For the lower speed, the steam takes the same path through the blades as before, and is then led from the second set of moving blades into a second group of blades consisting of two fixed and two moving sets. This arrangement gives a speed about half that due to the other, the reason being doubtless that, the expansion being carried through a longer stage, the drop in pressure at each set of blades is but half what it was before, with consequent proportional speed factor.

PERSONAL.

C. S. Robinson, formerly general manager of the iron and steel departments of the Colorado Fuel & Iron Company, has been elected second vice-president of the Youngstown Sheet & Tube Company. The office was created to give President James A. Campbell an assistant, as the latter has filled the two-fold position of president and general manager for years, and the work is too great for one man to look after.

Julian V. Wright has been appointed assistant to Acting Commissioner Robert Wuest of the National Metal Trades Association, Cincinnati. Mr. Wright has been connected with the National Cash Register Company, Dayton, Ohio, having charge of its labor and factory organization bureau.

Frank T. Locke, superintendent and manager of the Ticonderoga Machine Works, Ticonderoga, N. Y., has accepted a position as manager of the New York sales office of the Mine & Smelter Company, 42 Broadway, New York, where he will be located after September 10.

Thomas M. Voyle has been appointed manager of the Scranton Supply & Machinery Company, Scranton, Pa.

J. M. Lloyd, superintendent of the open hearth department of the Carnegie Steel Company's mills at South Sharon, Pa., has resigned that position, and on September 1 will assume the management of the open hearth furnaces of the Jones & Laughlin Steel Company, Pittsburgh.

Albert Patton, formerly assistant superintendent of the Republic Iron & Steel Company's Bessemer mills at Youngstown, Ohio, has resigned that position to become general superintendent of the National Tube Company at McKeesport, Pa. He has been succeeded at Youngstown by Harry McEldowney. Joseph Welsh has been promoted from night superintendent of the converting mill to manager of the same mill, and is succeeded as night superintendent by J. Draper.

Isaac A. Brown, for 12 years superintendent of transportation and labor at the Ohio Works of the Carnegie Steel Company, Youngstown, Ohio, has resigned and will take a long needed rest. He will be succeeded by his assistant, Robert Stickney, who has been connected with the works since their inception.

Prof. Mansfield Merriman has been granted a year's absence from the chair of civil engineering at Lehigh University, South Bethlehem, Pa., and will give the greater part of that time to practice as a consulting engineer, being associated with Clarence W. Hudson at 45 Broadway, New York. Mr. Hudson has resigned as assistant engineer of the Phoenix Bridge Company, giving up that position on September 1.

Horace R. Thayer has been appointed instructor in structural engineering in the School of Applied Science, Carnegie Technical School, Pittsburgh. He is at present connected with Lehigh University, South Bethlehem, Pa.

W. A. Chadwick, superintendent of the American Steel & Wire Company's South Sharon works, Sharon, Pa., resigned his position August 1 and will for the present retire from business for a much needed rest. He was succeeded by Geo. A. Paff, who has been employed in the same plant for several years in the capacities of master mechanic and assistant superintendent, respectively.

A. H. Carpenter, assistant manager of sales of the Chicago office of the Republic Iron & Steel Company, has tendered his resignation, effective September 1, and has accepted the position of general manager of the Corona Coal & Iron Company, Corona and Birmingham, Ala. Before going to Chicago in the capacity of sales manager of the branch office of the Tennessee Coal, Iron & Railroad Company, which was later merged with the office of the Republic Iron & Steel Company, he held the position of manager of sales of the coal and coke department of this company, with headquarters at Birmingham, Ala.

Thomas E. Evans, superintendent of the Eastern Steel Company, Pottsville, Pa., has resigned. Superintendent McDowell of the open hearth department has also re-

signed. Mr. Evans was superintendent of the Twenty-ninth street mills of the Carnegie Steel Company, Pittsburgh, prior to his engagement with the Eastern Steel Company. Mr. McDowell is the inventor of several useful improvements in reheating furnaces and proposes to locate in Pittsburgh.

NEWS OF THE WORKS.

Iron and Steel.

The Wilkes Rolling Mill at Sharon, Pa., which has been idle for most of the last two years, is to resume operations at once.

The city council of Brazil, Ind., has granted free taxes and free water to the Central Iron & Steel Company, and the Commercial Club has raised \$24,000 in cash as a bonus to the company, which is under contract to build a plant in the city.

The DuBois Iron Works, DuBois, Pa., has been organized with a capital of \$100,000. The incorporators are John E. DuBois, E. A. Badger and C. W. Pentz, DuBois, Pa.

Riverside Furnace of the National Tube Company at Wheeling, W. Va., blew in in July after repairs and relining.

No. 2 Sloss furnace of the Sloss-Sheffield Iron & Steel Company, Birmingham, Ala., blew in on July 2, and on the same day the Lady Ensley furnace of the same company resumed after repairs.

One Clifton furnace at Ironaton, Ala., of the Alabama Consolidated Coal & Iron Company, resumed in July, having been out for some weeks for repairs. Both Clifton furnaces were in blast on August 1.

Hot mills Nos. 1 to 10 of the American Sheet & Tin Plate Company, at South Sharon, Pa., resumed operations August 13, and it is expected that the mills numbered from 11 to 20 will resume within a short time. Hot mills numbered from 1 to 8 of the same company, at New Castle, Pa., also resumed on August 13.

The Empire Rolling Mill Company, Newburg, Ohio, has just opened up a new bar iron mill which has a capacity of 100 tons a day.

Superintendent George D. Evans of the South Sharon plant of the American Sheet & Tin Plate Company reports that it will be three or four weeks before the Bray sheet mill will be ready to put in operation. The foundation for the engine has been completed and part of the machinery has been installed.

Work on the new furnaces of the Republic Iron & Steel Company at Haseltown, Ohio, is progressing rapidly, and it is expected that both stacks will be in operation by early fall. The new furnaces will be the most improved and up to date operated by the Republic Company.

The 16-in. mill of the Shenango Iron & Steel Company at Wheatland, Pa., has been forced to suspend on account of the scarcity of heaters. The mill will resume as soon as the necessary men can be procured.

The recently organized Perry Iron Company, Erie, Pa., has purchased its blowing engines from the William Tod Company, Youngstown, Ohio; its boilers from the Rust Boiler Company, Pittsburgh, Pa., and stoves from the George W. McClure & Sons Company. Other contracts for the company's equipment are pending and will be let shortly. The officers of the new corporation are T. S. Clark, president; M. L. Mozler, secretary and treasurer, and E. H. Williams, vice-president and general manager. The directors are Mr. Clark, Mr. Williams, Davenport Galbraith, Erie; B. J. Walker, Erie; and W. L. Smith, Pittsburgh.

General Machinery.

The Peter McFarlane & Sons Iron Works Company has been organized at Denver, Colo., to manufacture mining and milling machinery. The company is installing machinery in an existing plant and will be ready for business by August 20. Peter McFarlane is president; George M. McFarlane, vice-president; Frederick McFarlane, secretary and treasurer, and John Ramussen, manager.

Manzel Bros., manufacturers of automatic Oil Pumps, Buffalo, are erecting a factory building 50 x 150 ft. and two stories in height on Babcock street, that city, to manufacture their specialties.

The Hiller Mfg. Company has been incorporated at Rochester, N. Y., to manufacture metal and wood specialties. The capital is \$5000, and the incorporators are O. P. Hiller, G. A. Hiller, and C. H. Peck, all of Rochester.

The Hudson Iron Company will blow in its furnace at Seacaus, N. J., early in September, after extensive repairs and improvements which have been in progress since January.

The American Brass and Aluminum Works has been incorporated at Indianapolis, Ind., with \$10,000 capital stock. The directors are Frederick Sattley, Walter J. Tingle and Harold Taylor.

Power Plant Equipment.

The Westinghouse Machine Company, East Pittsburgh, Pa., recently sold to the United States Government for use in connec-

tion with the Panama Railroad two compound steam engines, one directly connected to a 325 kw. generator, and the other to a 200 kw. generator. Two 165 hp. producer gas engines are to be installed in the plant of the Calgary Milling Company, Calgary, Alberta, Canada. The engines operate at an altitude of 3000 ft., using anthracite coal for fuel, with possibility of a change to natural gas as soon as supply is obtained. G. & O. Braniff & Co. have ordered a 300 kw. Westinghouse-Parsons steam turbo-generator, to be installed in the plant of S. Roberts & Co., Mexico City, Mexico. The Rio Janeiro Tramway, Light & Power Company will install at Rio Janeiro, Brazil, a 300 kw. Westinghouse compound engine, directly connected to a Westinghouse generator.

The Southern Engine & Boiler Works, Jackson, Tenn., has purchased the property of the Jackson Milling Company, adjacent to its own works, and has acquired an additional piece of land 200 x 300 feet in size. The company purchased all the machinery of the Jackson Milling Company, which has been used only four years, and will utilize considerable of it for its new plant.

The Westinghouse Machine Company, East Pittsburgh, Pa., has contracted with the Sheffield Company, Sheffield, Ala., for a 1250 kw. Westinghouse-Parsons steam turbine, which will run under rather poorer operating conditions than usual—a steam pressure of 125 lb. and 26 in. vacuum. It will be directly connected to a Westinghouse three-phase turbo-generator of the enclosed type, delivering current at 2300 volts to a light and power system.

The White River Power Company has been organized at Vincennes, Ind., with \$500,000 capital. Eugene Rush, Detroit, Mich., is president and general manager; E. H. DeWolfe, Vincennes, vice-president and assistant general manager; J. T. Small, Frankfort, Ind., secretary and chief electrician; L. C. Embry, Princeton, Ind., treasurer and general counsel. The company proposes to dam White River at Decker, Ind., and to establish a hydraulic plant to supply electric power to cities within a radius of 50 miles. The estimated cost of the plant is \$1,500,000.

Foundries.

The W. P. Taylor Company, Founders, Buffalo, successors of Bingham & Taylor, is increasing the capacity of its plant by the erection of a new foundry building 150 x 170 ft. in size.

The Lizzie Lowman Company, Sheffield, Ala., has been incorporated to manufacture stoves, with an authorized capital of \$36,000, one-quarter of which is paid in. The incorporators are E. J. Lowman, S. A. Lowman, J. L. Andrews and L. W. Payne. S. A. Lowman will be general manager of the company, and the principal office will be at Sheffield.

Hardware.

At the annual meeting of the stockholders of the Griffin Mfg. Company, Erie, Pa., on August 7, it was decided to double the capital stock of the company, all the new stock being taken by former stockholders.

W. F. Price, Reading, Pa., manufacturer of gasoline lamps, has recently added the chandelier business, and is now making a full line of gas, electric and combination chandeliers.

The Ira B. Smith Company has succeeded Ira B. Smith, Bristol, Conn., in the manufacture of light hardware and specialties; also dies and punches. The company comprises Marshall I. and Robert M. Smith.

Miscellaneous.

The American Locomotive Company, Pittsburgh Works, Allegheny, Pa., is building three locomotives for the Kansai Railroad of Japan, duplicates of some which the company built for the road in 1898.

The Smyth Pierce Company, New Brighton, Pa., has leased a part of the second floor of the main building of the Bentley & Gerwig twine factory, and it will be fitted up for the manufacture of signature gathering machines and book sewing machines. Heretofore the company has had its plant in part of the Pierce-Crouch Engine Company's building. Several of the gathering machines are in successful operation, and the first of the sewing machines is in use in a bindery in one of the large cities. The company is not in the market for any tools, but desires catalogues and circulars from manufacturers and dealers in tools and supplies.

The Acme Jack Company has been incorporated at Bloomfield, Ind., with \$10,000 capital stock, to manufacture lifting jacks. The directors are Wm. S. Bogy, Frank W. Shryer, David O. Johnson and Chas. E. Henderson.

The Indianapolis Excelsior Machinery Company has been incorporated at Indianapolis, Ind., with \$10,000 capital stock. The directors are Henry Rosenberg, E. Rosenberg, Chas. Herdrich and L. Herdrich.

The Standard Chain Company, Marion, Ind., is enlarging its plant, so as to give employment to 50 additional workmen. Its present force is 160.

The B., H. & B. Combination Tie Company has been organized at Indianapolis, Ind., by George E. Blaine and Edward Hill of that city, the inventors of a new cross tie for railroads. A

factory will be built for the manufacture of the tie, which is of steel and wood. It consists of two blocks of wood, connected by a steel bar. The bar serves as a tie plate to prevent the rails from cutting into the wood and as a gauge bar to keep the rails in exact gauge and prevent spreading.

The Worth Mfg. Company has been organized and incorporated at Evansville, Ind., to manufacture automobiles. The capital stock is \$100,000. James M. Worth is president.

A Pennsylvania charter has been granted to the Juniata Valley Electric Railway Company to construct a plant and build a line in Huntingdon, Pa. The incorporators are M. W. Wilson, Alexandria; R. W. Jacobs, H. E. Steel, F. B. Isenberg and W. H. Boggs, Huntingdon.

The Conemaugh Valley Railroad Company has been formed at Johnstown, Pa., with P. J. Little, Ebensburg, Pa., as president. It will build a trolley system from Johnstown to Ebensburg.

The Western Railroad Company has purchased about 54 acres of land in West Virginia, two miles from Cumberland, Md., which the company states will be used for additional side tracks at present, but enough ground was acquired to permit the adding of shop facilities later on, if the company so desires.

The Crossley Company, Buffalo, manufacturers of Stamped Sheet Metal, are adding a wing 30 x 80 ft. and two stories in height to its factory to increase its press-room facilities. The erection of an additional building is contemplated later on.

The Hazard, Coates & Bennett Company has been incorporated at Rochester, N. Y., with a capital of \$400,000, to establish a plant at Gates, Monroe County, for smelting and refining metals. The directors are Ernest C. Hazard, George R. Coates and John Bennett, all of Rochester.

The T. A. Houghton Company, Rochester, N. Y., has been incorporated to manufacture electrical surgical and dental instruments with a capital of \$20,000. The directors are Thomas A. Houghton, Wm. F. Martens, John H. Armstrong, Wm. H. Barr and Frederick F. Remmel.

The Pittsburgh Pole & Forge Company, Pittsburgh, Pa., has been incorporated to manufacture iron and steel poles. The capital stock is \$10,000, and the incorporators are W. M. Davis, F. P. Patterson and J. R. D. Huston.

Foundry Blowers.

In applying a centrifugal blower to a cupola there are certain facts relating to its efficiency that often escape attention. Theoretically the square inches of blast of a pressure blower should be approximately equal to the free area through the fuel and iron, plus an amount compensating for the resistance of piping, tuyere boxes, fuel and iron, these resistances being equivalent to just so much reduction in area. Differences in the length and arrangement of piping in different plants and of size, quantity and character of charges in the same plant, introduce such variable conditions that it is impossible to design a blower of any type that will always be exactly proportioned to the work to be done. For this reason the power required to operate a blower cannot be given as an absolute quantity, but can be determined only when all the conditions are known.

It is customary in specifying the pressure required to operate a cupola to refer to that in the wind box. However, the tables of blower speeds presented in the catalogues published by the B. F. Sturtevant Company and other makers of blowers give the numbers of revolutions necessary to produce a given pressure at the fan outlet, and owing to the losses due to transmission this pressure cannot be maintained at a more distant point, such as the wind box of a cupola, without increasing the speed correspondingly. Failure on the part of the purchaser to recognize this fact and make allowance for the transmission losses sometimes results in too low a pressure at the cupola, which is unjustly blamed on the blower.

Large, straight and short connections from blower to cupola are imperative to avoid waste of power, and if changes in direction of piping are necessary they should be made with a large radius of curvature. It should be distinctly understood that the power required to operate a fan blower is proportional to the area of discharge. If this area be reduced to zero by closing the blast gate the power will be reduced to merely that due to friction of the machine and the air confined within the case. It is a common mistake to think that closing the pipe increases the power, but as power is expended only when air is moved it is evident that this is a fallacy.

The Iron and Metal Trades

In Pig Iron the tide of buying as well as of values continues to rise. Such a movement in August, it is safe to say, is without parallel. Whether appreciation is general enough of its possibilities for harm really to avert the danger remains to be seen. That there is some excitement and that excitement is to be deprecated is admitted.

Heavy purchases of Bessemer and Foundry Irons for delivery in the first quarter and the first half of 1907 are the significant developments of the week. Practically all the Steel making Pig Iron that can be produced at merchant furnaces in the remainder of this year had been swept up. To the foundry trade an equally significant fact is that what little Foundry Iron is available for this year's delivery can only be had at advancing prices and usually in connection with contracts for 1907 Iron.

Steel manufacturers in the Central West, in view of the shortage in Bessemer Iron for 1906, have come into the market for 1907 requirements, and sales of 100,000 tons at \$17.75 at Valley furnace have been made for delivery in the first half of next year. The United States Steel Corporation has not yet participated in the buying for 1907. In common with other Steel manufacturers it will find it necessary to limit its Steel production in the balance of this year because of inability to get Pig Iron. It has been a buyer of Melting Scrap, however, though the relief in this direction is but slight. The Corporation bought 13,000 tons of Basic Iron at \$17.90 to \$18.00, delivered at Pencoyd, Pa., in the last quarter of the year, taking all the Eastern Basic that was offered. The total of purchases of Basic in the past month for Eastern Steel works reached 250,000 tons, quite a little being for the first quarter of 1907.

Sellers of Foundry Iron have put up their prices about 50 cents a ton in the week, and the market is still rising. The minimum for Southern No. 2 is now \$14.50 at furnace, and sales at \$15 have reached a respectable aggregate. In the Cleveland district melters of iron are going far afield for supplies, and there is little promise of an abatement of the present scarcity this year.

Eastern Pennsylvania furnaces, which sold on the basis of \$17.75 at furnace for No. 2 Foundry Iron two weeks ago and at \$18 last week, have now put their prices at \$18.50. Sales in New England and the East in the past week amounted to 80,000 to 90,000 tons, largely for next year's delivery. The importation of Pig Iron is not an immediate contingency. A further advance of about \$1 a ton might let in some iron for consumption at tidewater, but even at a parity foreign Iron would be taken very reluctantly.

The Steel market shows further tension. In the Chicago district a sale of Forging Billets for 1907 has been made at \$38.

Track Supplies have been heavily bought in the West, and Spikes have advanced \$2 a ton. In Rails a lull appears in all markets.

A meeting of Steel Corporation sales agents in the past week brought out reports of the most optimistic character. No precedent for present conditions at this season is found in the experience of those longest in the business.

The Cast Iron Pipe trade presents the unheard of phenomenon of spring orders being placed in August. At Kansas City a 5000-ton contract for Cast Pipe was taken by the largest producer.

The Steel Corporation is sold up on Sheets and Tin Plates to the end of the year, but independent interests, in the present scarcity and high price of Steel, are not reaping a harvest.

The Bar situation is increasingly strong and the possibility of an advance is intimated.

Scarcity of Coke adds to the difficulties of the situation. The Steel Corporation is still a buyer.

With all the abundance of home demand the call for export material is unabated.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Aug. 15, 1906.	Aug. 8, 1906.	July 17, 1906.	Aug. 16, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia.....	\$18.75	\$18.75	\$18.25	\$16.25
Foundry No. 2, Southern, Cincinnati.....	17.50	17.00	16.00	14.50
Foundry No. 2, Local, Chicago.....	19.00	18.75	18.25	16.25
Bessemer, Pittsburgh.....	18.85	18.85	18.60	15.10
Gray Forge, Pittsburgh.....	17.85	17.35	16.35	14.40
Lake Superior Charcoal, Chicago.....	19.25	19.25	19.00	17.00

BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh.....	28.00	27.50	27.50	24.00
Forging Billets, Pittsburgh.....	33.00	33.00	33.00	26.00
Open Hearth Billets, Phila.....	29.00	29.00	29.00	26.50
Wire Rods, Pittsburgh.....	34.00	34.00	34.00	32.50
Steel Rails, Heavy, Eastern Mill.....	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago.....	14.50	14.00	14.00	14.00
O. Steel Rails, Philadelphia.....	16.75	16.75	16.25	16.00
O. Iron Rails, Chicago.....	22.00	21.25	21.25	19.00
O. Iron Rails, Philadelphia.....	21.00	21.00	20.50	20.00
O. Car Wheels, Chicago.....	18.50	18.00	18.00	14.75
O. Car Wheels, Philadelphia.....	16.75	16.50	16.00	15.00
Heavy Steel Scrap, Pittsburgh.....	16.00	16.50	15.75	15.00
Heavy Steel Scrap, Chicago.....	14.00	13.00	13.50	13.00

FINISHED IRON AND STEEL, Per Pound:				
Refined Iron Bars, Philadelphia.....	1.63½	1.63½	1.63½	1.63½
Common Iron Bars, Chicago.....	1.66½	1.66½	1.66½	1.55
Common Iron Bars, Pittsburgh.....	1.50	1.50	1.50	1.60
Steel Bars, Tidewater, New York.....	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh.....	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York.....	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.60
Beams, Tidewater, New York.....	1.84½	1.84½	1.84½	1.74½
Beams, Pittsburgh.....	1.70	1.70	1.70	1.60
Angles, Tidewater, New York.....	1.84½	1.84½	1.84½	1.74½
Angles, Pittsburgh.....	1.70	1.70	1.70	1.60
Skelp, Grooved Steel, Pittsburgh.....	1.57½	1.57½	1.57½	1.50
Skelp, Sheared Steel, Pittsburgh.....	1.60	1.60	1.60	1.55

SHEETS, NAILS AND WIRE, Per Pound:				
Sheets, No. 27, Pittsburgh.....	2.40	2.40	2.40	2.20
Wire Nails, Pittsburgh.....	1.80	1.80	1.85	1.80
Cut Nails, Pittsburgh.....	1.75	1.75	1.75	1.65
Barb Wire, Galv., Pittsburgh.....	2.30	2.30	2.30	2.25

METALS, Per Pound:				
Lake Copper, New York.....	18.62½	18.62½	18.37½	16.00
Spelter, St. Louis.....	5.90	5.90	5.85	5.65
Lead, New York.....	5.75	5.75	5.75	4.60
Lead, St. Louis.....	5.65	5.65	5.70	4.60
Tin, New York.....	41.50	39.00	36.25	32.62½
Antimony, Hallett, New York.....	23.00	23.00	22.50	14.50
Nickel, New York.....	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York.....	\$3.94	\$3.94	\$3.94	\$3.74

Chicago.

FISHER BUILDING, August 15, 1906.—(By Telegraph.)

While the feverish activity which has characterized the Pig Iron market during the past few weeks has subsided to some extent there is none the less considerable inquiry extending well through the first half of next year and the buying is of fair volume. Further price advances on both Northern and Southern grades have been recorded and still higher values on spot Iron will prevail unless there is an immediate improvement in shipments from the furnaces. Western Steel casting plants, on account of their inability to secure desired deliveries of Low Phosphorus Iron, are negotiating for a large tonnage of foreign material which can now be brought into this market, notwithstanding the high freight from seaboard, at a cost several dollars a ton below the domestic product, which is quoted at \$26.50 to \$27, Pittsburgh. On other grades, as well as the crude forms of Steel, the import movement will depend entirely on future enhancement of values, as the high prices obtained abroad militate against early action in this direction. The heavy inquiries for Basic Iron noted last week have developed into purchases of only 6000 tons thus far, and sales of Foundry Iron through the first half have not been in proportion to previous inquiry. One large foundry closed for 5000 tons of Southern Iron on the basis of \$14.50, Birmingham, for No. 2, and scattering sales of Northern grades in lots ranging from 500 to 1500 tons were made at \$18.50. These prices show an advance of 50c. a ton, and both Northern and Southern operators are asking a further premium of a half dollar a ton on small lots for prompt delivery. The tonnage available for the remainder of the third quarter is limited, although several Southern interests have considerable unsold Iron for the fourth quarter, which is

being held for higher values and which is not being offered at present. A large Youngstown Steel interest has made inquiry for 18,000 tons of Bessemer for first quarter delivery, while the Illinois Steel Company continues to take all odd lots offered for early shipments. One lot of 500 tons purchased by a consumer in this district was sold at \$18.50, Youngstown, the \$18 basis having been withdrawn several days ago. With the exception of Rails, Track Material and Wire products finished lines are quiet, consumers having pretty generally covered their future needs during the past two or three months. Rail inquiries total 50,000 tons, the Missouri, Kansas & Texas again figuring prominently, while transactions in Track Supplies have been on an unprecedented scale, the Illinois Steel Company alone having booked 14,000 tons of Spikes this month. The American Steel & Wire Company has announced a further advance of \$2 on this material for delivery the remainder of the year, while premiums prevail for immediate shipment. An early advance on Wire products is anticipated by the trade, and the congestion at the mills during the fall months from early indications promises to be without parallel. Steel for the Kesner Building, amounting to 900 tons, has been placed, and Kansas City has provided for its year's requirements of Cast Iron Pipe, which will reach an aggregate of 5000 tons. In sympathy with Pig Iron Old Material has advanced sharply.

Pig Iron.—The shortage of stocks in foundry yards, coupled with delayed furnace shipments, has developed an active market for Pig Iron for spot shipment, and Southern producers are asking \$15, Birmingham, for No. 2, while local stacks are quoting \$19. The extent of this concurrent business indicates that many of the consumers, although covered, are not receiving their material as rapidly as required, and this shortage will grow more acute as the melt increases with the advent of the fall months. Virginia operators are strictly maintaining a basis of \$17, furnace, for both Basic and No. 2 Foundry, and all inquiries must be submitted before the business is accepted. The noteworthy sales of the week include 6000 tons of Virginia Basic for delivery the remainder of the year at \$16.50, furnace, and 5000 tons of Southern Foundry at \$14.50, Birmingham, for No. 2. While the inquiry for forward shipment continues heavy, it is not as intense as during the earlier days of the month, and it is probable that many consumers are awaiting further developments before closing for their requirements so far ahead. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal.....	\$19.25 to \$19.50
Northern Coke Foundry, No. 1.....	19.50 to 19.75
Northern Coke Foundry, No. 2.....	19.00 to 19.25
Northern Coke Foundry, No. 3.....	18.50 to 18.75
Northern Scotch, No. 1.....	19.50 to 20.00
Ohio Strong Softeners, No. 1.....	19.55 to 19.80
Ohio Strong Softeners, No. 2.....	19.05 to 19.30
Southern Coke, No. 1.....	18.90 to 19.40
Southern Coke, No. 2.....	18.40 to 18.90
Southern Coke, No. 3.....	17.90 to 18.40
Southern Coke, No. 4.....	17.40 to 17.90
Southern Coke, No. 1 Soft.....	18.90 to 19.40
Southern Coke, No. 2 Soft.....	18.40 to 18.90
Southern Gray Forge.....	15.90 to 16.40
Southern Mottled.....	16.40 to 16.90
Malleable Bessemer.....	18.75 to 19.00
Standard Bessemer.....	20.30 to 20.55
Jackson Co. and Kentucky Silvery, 6 %.....	20.30 to 20.80
Jackson Co. and Kentucky Silvery, 8 %.....	21.30 to 21.80
Jackson Co. and Kentucky Silvery, 10 %.....	22.30 to 22.80

(By Mail.)

Billets and Rods.—Western consumers of Forging and Axle Billets are beginning to provide for their needs during the first half of 1907, and we note the sale of 2000 tons of Axle Billets by a local mill, on the basis of \$38 a ton. With the completion of its Universal Plate mill and the addition of the Light Rail mill the Illinois Steel Company, which only recently increased its Open Hearth producing capacity by the erection of seven furnaces, will again be out of the market as a seller of Steel, and the supply will have to be provided either by local independent mills or from those in the East. On account of the high prices ruling on Forging Billets, Birmingham producers are selling freely in this market for prompt deliveries, and are asking from \$34 to \$35. Heavy sales of Wire and Chain Rods also continue to be made, running through the remainder of the year, at prices ranging from \$36 to \$37.

Rails and Track Supplies.—Rail inquiries from Western roads received during the week aggregate 5000 tons, the Missouri, Kansas & Texas asking for material to be used in the laying of 150 miles of track. There has been no abatement in the demand for Track material, orders received thus far this month by the leading interest aggregating 14,000 tons of Spikes and Bolts, and Splice Bars in proportion. The American Steel & Wire Company this week announced an advance of \$2 a ton on Spikes for delivery within two or three months, while on prompt shipments as high as 2.40c. to 2.50c. is asked. Inquiry for Light Rails shows no decline and as the Illinois Steel Company will be out of the market for at least three months Eastern mills are booking practically all the offerings. Quotations are as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.25c. to 2.35c.; Track Bolts,

2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$28 to \$29; 25-lb., \$30; 20-lb., \$30 to \$31; 15-lb., \$31 to \$32; 12-lb., \$32 to \$33, and lighter sections down to 8-lb., \$38 to \$40, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—The Morava Construction Company was awarded the contract for furnishing the Steel, amounting to 900 tons, to be used in the erection of the Kesner Building. The material is to be in place within three months, under penalty, and several of the large fabricators refused to figure on the work on account of their inability to meet these specifications. The Pennsylvania Steel Company reports the receipt of 200 tons of bridge material, but otherwise the market has been comparatively quiet. A number of large buildings are being figured on, but as yet have not been closed. Quotations are firm but unchanged, as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—Since the booking of the large tonnage for lake shipbuilders new business has been quiet, but specifications are considerably in excess of shipments and the orders now on the books of the mill for both Sheared and Universal Plates will carry them well through the remainder of the year. Concessions offered until recently by an Ohio Valley mill on Universal Plates have been withdrawn, and the market is firmly maintained on the following basis: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8, up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—On account of the high prices ruling for raw material some of the independent Sheet mills are in favor of an advance of at least \$2 a ton. Premiums in a few instances have been paid on Blue Annealed Sheets for immediate delivery, but for forward shipment prevailing quotations obtain. New tonnage is not quite as heavy as during the early weeks in July, and a few of the mills are gaining slightly on the tonnage carried on their books. Quotations are firm, as follows: Blue Annealed, No. 10, 1.91½c.; No. 12, 1.96½c.; No. 14, 2.01½c.; No. 16, 2.11½c.; Box Annealed, Nos. 17 to 21, 2.41½c.; Nos. 22 to 24, 2.46½c.; Nos. 25 and 26, 2.51½c.; No. 27, 2.56½c.; No. 28, 2.66½c.; No. 29, 2.81½c.; No. 30, 2.91½c. Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 15 and 16, 2.81½c.; Nos. 17 to 21, 2.96½c.; Nos. 22 to 24, 3.11½c.; Nos. 25 and 26, 3.31½c.; No. 27, 3.51½c.; No. 28, 3.71½c.; No. 30, 4.21½c. Sheets from store: Blue Annealed, No. 12, 2.15c. to 2.25c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Box Annealed, Nos. 18 to 20, 2.60c. to 2.70c.; Nos. 22 to 24, 2.65c. to 2.75c.; No. 26, 2.70c. to 2.80c.; No. 28, 2.85c. to 2.95c.; No. 30, 3.25c. to 3.35c. Galvanized from store: Nos. 10 to 20, 3.10c. to 3.20c.; Nos. 22 to 24, 3.35c. to 3.45c.; No. 26, 3.45c. to 3.55c.; No. 27, 3.55c. to 3.75c.; No. 28, 3.85c. to 3.95c.; No. 30, 4.45c. to 4.55c.

Bars.—None of the independent Iron mills has followed the initiative taken by the Republic Iron & Steel Company in marking up quotations \$2 a ton, and all the business that has been placed during the week has been on the basis of 1.50c., Pittsburgh, or 1.66½c., Chicago. Steel Bar specifications are exceedingly heavy for this season and are greatly in excess of mill shipments, and deliveries are constantly being deferred. New tonnage, however, is exceedingly light and is limited almost entirely to small lots for early delivery, all of the large consumers having covered their wants until July next year during the past three months. Quotations are as follows: Iron Bars, 1.66½c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—While some concessions from the established price of the National Tube Company have been made by a few of the independent mills they are by no means general, and are only offered in exceptional cases where very desirable tonnage is involved. In comparison with the prices prevailing on other finished products the basis is exceedingly low and, the cost of Skelp considered,

can only net the independent manufacturer a loss. Contemporaneous buying is heavy, but jobbers are not placing contracts for their future requirements, notwithstanding the low quotations that are ruling. Sales continue to be made on the basis of 81 and 5 off the list, Pittsburgh, and discounts in car lots, Chicago, are as follows: Black Steel Pipe, 79.35 per cent. on the base sizes, $\frac{3}{4}$ to 6 in., and Galvanized, 69.35 per cent. Iron Pipe is quoted from $1\frac{1}{2}$ to 2 points higher. From store in small lots Chicago jobbers are quoting 76 $\frac{1}{2}$ to 77 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in.

Boiler Tubes.—Continued heavy specifications, with little new buying, sums up the situation on Boiler Tubes. All of the large users covered their requirements some months ago when the present prices were first announced and are now specifying on the contracts then closed. Mill quotations are well maintained, as follows, on base sizes, 2 $\frac{3}{4}$ to 5 in., in car lots; Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2 $\frac{1}{2}$ in. and smaller and lengths over 18 ft., and 2 $\frac{1}{2}$ -in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1 $\frac{1}{2}$ in.	4	35	42 $\frac{1}{2}$
1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ in.	50	35	35
2 $\frac{1}{2}$ in.	52 $\frac{1}{2}$	35	30
2 $\frac{3}{4}$ to 5 in.	60	47 $\frac{1}{2}$	42 $\frac{1}{2}$
6 in. and larger.	50	35	..

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was awarded the contract for the Pipe requirements for the year ending June 30, 1907, by Kansas City, Mo., amounting to 5000 tons. Current demand, notwithstanding the midsummer season, is sufficiently heavy to prevent the Pipe foundries making any appreciable gain on the tonnage on their books and the indications are that when winter sets in many unfilled orders will be carried over. We revise quotations as follows: Water Pipe, 4-in., \$33; 6, 8, 10 and 12 in., \$32; over 12-in., \$31, with \$1 extra for Gas Pipe.

Merchant Steel.—The mills are now principally concerned with the delivery of material on contracts placed some months ago, and as specifications are much heavier than shipments deliveries are being deferred. Quotations are unchanged, as follows: Planished or Smooth Finished Tire Steel, 1.86 $\frac{1}{2}$ c.; Iron Finish, up to $1\frac{1}{2}$ x $\frac{1}{2}$ in., 1.81 $\frac{1}{2}$ c.; Iron Finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.66 $\frac{1}{2}$ c., base; Channels for solid rubber Tires, $\frac{3}{4}$ to 1 in., 2.16 $\frac{1}{2}$ c., and $1\frac{1}{8}$ -in. and larger, 2.06 $\frac{1}{2}$ c.; Smooth Finished Machinery Steel, 1.91 $\frac{1}{2}$ c.; Flat Sleigh Shoe, 1.71 $\frac{1}{2}$ c.; Concave and Convex Sleigh Shoe, 1.96 $\frac{1}{2}$ c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21 $\frac{1}{2}$ c.; Railway Spring, 1.86 $\frac{1}{2}$ c.; Crucible Tool Steel, 6 $\frac{1}{2}$ c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Coke.—A scarcity of both Connellsville and By-product Coke for prompt delivery has developed, and local dealers are exacting premiums ranging from 25 to 50 cents a ton for material on track. Virginia operators have made sharp advances and are now quoting \$3.25 at the ovens, as compared with \$3 asked by Connellsville producers. By-product Coke for early delivery is also exceedingly scarce, although as yet no premiums have been asked. We quote strictly high grade Foundry Coke as follows: By-product, \$5.65 to \$5.75; Virginia, \$5.50; Connellsville, \$5.65 to \$5.90.

Old Material.—Advances ranging from 50 cents to \$1 a ton were made on practically all grades of Scrap during the past week, this upward movement being due more to an effort on the part of dealers to maintain this market on the proper basis of relationship to Pig Iron values than to heavy purchases by consumers. Transactions among dealers are, however, in greater volume than heretofore, the bulk of the material going in on short sales, and they are buying now and are making heavy deliveries to consumers to avoid the higher prices toward which the market is inclined. Steel mills, owing to the high cost of Steel making Irons and the increasing difficulty they are experiencing in securing deliveries, are asking for prices on Heavy Melting Steel, and some large transactions are looked for in the next few weeks. Cast Scrap, which has been held on a high level throughout the summer, has again advanced owing to the increased consumption, as the foundries are now using a higher percentage in their mixtures on account of the prices prevailing on all grades of Foundry Iron. An average of 50 cents a ton above our last quotation was secured by the Baltimore & Ohio on its 8000 tons of material, most of the Cast Scrap coming to this market. The Southern Railroad will dispose of 2500 tons on Wednesday, a large portion of which is at Indiana points. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails.	\$22.00 to \$22.50
Old Steel Rails, 4 ft. and over.	15.50 to 16.00
Old Steel Rails, less than 4 ft.	14.50 to 15.00
Heavy Relaying Rails, subject to inspection, 50 lb. and under.	27.50 to 28.00
Old Car Wheels.	18.50 to 19.00
Heavy Melting Steel Scrap.	14.00 to 14.50
Frogs, Switches and Guards.	14.00 to 14.50
Mixed Steel.	12.00 to 12.50

The following quotations are per net ton:

No. 2 Mill.	8.00 to 8.50
Iron Fish Plates.	\$16.00 to \$16.50
Iron Car Axles.	22.50 to 23.00
Steel Car Axles.	18.50 to 19.00
No. 1 Railroad Wrought.	14.00 to 14.50
No. 2 Railroad Wrought.	13.00 to 13.50
Railway Springs.	13.50 to 14.00
Locomotive Tires, smooth.	14.00 to 14.50
No. 1 Dealers' Forge.	12.00 to 12.50
Mixed Bushelling.	10.00 to 10.25
Iron Axle Turnings.	10.00 to 10.25
Soft Steel Axle Turnings.	9.50 to 9.75
Machine Shop Turnings.	9.50 to 9.75
Cast Borings.	8.00 to 8.50
Mixed Borings, &c.	8.00 to 8.50
No. 1 Mill.	9.00 to 9.50
No. 1 Rollers, cut to Sheets and Rings.	10.00 to 10.50
No. 1 Cast Scrap.	14.00 to 14.50
Stove Plate and Light Cast Scrap.	11.50 to 12.00
Railroad Malleable.	13.50 to 14.00
Agricultural Malleable.	13.00 to 13.50

Metals.—Pig Tin continues to advance under the influence of speculation and a scarcity of material. Supplies are so limited in this market that even the higher prices named do not represent, in some cases by even several cents a pound, the figures at which Pig Tin could be purchased. Copper retains its steadiness, and a maintainance of prices is looked for for some time to come, although new business being placed is insignificant. We quote: Casting Copper, 18 $\frac{3}{4}$ c. to 18 $\frac{1}{2}$ c.; Lake, 18 $\frac{1}{2}$ c. to 19 $\frac{1}{4}$ c., in car lots; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; Pig Tin, car lots, 42 $\frac{1}{4}$ c. to 42 $\frac{3}{4}$ c.; small lots, 42 $\frac{1}{2}$ c. to 43 $\frac{1}{2}$ c.; Spelter, prompt delivery, 6.20c. to 6.30c., for car lots; Lead, Desilverized, 5.90c. to 6c., for 50-ton lots; Corroding, 6.57 $\frac{1}{2}$ c. to 6.67 $\frac{1}{2}$ c., for 50-ton lots; on car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Cookson's Antimony, 28c., and other grades, 26c. to 27c.; Sheet Zinc is \$7.75 list, f.o.b. Laselle, in car lots of 60-lb. casks. On Old Metals we quote: Copper Wire, 16 $\frac{1}{4}$ c.; Heavy Copper, 16 $\frac{1}{4}$ c.; Copper Bottoms, 15 $\frac{1}{2}$ c.; Copper Clips, 15 $\frac{1}{2}$ c.; Red Brass, 15 $\frac{1}{2}$ c.; Red Brass Borings, 13 $\frac{3}{4}$ c.; Yellow Brass, 12 $\frac{1}{4}$ c.; Yellow Brass Borings, 10 $\frac{1}{4}$ c.; Light Brass, 8 $\frac{3}{4}$ c.; Lead Pipe, 5 $\frac{1}{2}$ c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 24c.; Tin Foil, 32c.; Block Tin Pipe, 27 $\frac{1}{2}$ c.

The Isaac Joseph Iron Company, Chicago and Cincinnati, dealer in Old Material and second-hand machinery, has established a Scrap yard at Ninety-third street and Anthony avenue, South Chicago, Ill. The property has a frontage of 1500 ft., and is 180 ft. deep. A rail shear and derrick will be installed, a 100-ton scale already having been purchased.

Philadelphia.

REAL ESTATE TRUST BUILDING, August 14, 1906.

Conditions in the Iron and Steel trades are becoming fierce. There is the greatest difficulty possible in satisfying buyers, who, like Oliver Twist, are always asking for "more." That there is a scarcity of Pig Iron is undoubted, and that it is liable to continue some weeks longer is also quite probable, but that there will be enough scarcity to interfere with consumption is not at all likely. Conditions at furnaces will improve after a while, and some foreign Iron is already beginning to arrive, but, of more importance than that, consumers are in many cases greatly exaggerating their necessities. Instances are known in which sellers of Iron were so badgered for deliveries that they sent out special agents to investigate, and in nearly all cases found that the amount in yards was about normal. When attention was called to the fact, the reply by consumers was that they could not afford to let their stocks run down, that they were consuming very heavily and were unwilling to have less than a month's supply on hand. It's the same old story—when there is plenty of Iron the furnaces have to carry it; when there is an apparent scarcity consumers want all there is in sight, they want it bad and they want it quick. This feature deserves serious consideration, as it is liable to lead to fictitious assumptions, not only as regards stocks, but as regards values, which, of course, are governed by supply and demand. Perhaps makers of Pig Iron are not entirely free from exaggeration as regards their side of the case. The withholding of the monthly report of stocks by the furnaces seems to have been a step backward, and when the time comes—as it will some day—they will probably realize that fact. When the trade finds that there is more Iron for sale than is needed, and nothing to show what the stocks really are, it is almost certain that buyers will exaggerate the amount and run to the extreme of taking nothing but hand to mouth lots. There is a good deal of force in the old saying that "the devil we know is not feared half as much as the devil we don't know." Be that as it may, there is a semipanic among consumers and it will be difficult to avoid unfortunate consequences, either through a temporary disturbance in values or through imports of foreign Iron, for which preliminary steps have already been taken. Under present conditions it is impossible to say what turn prices will take, but in view of the heavy purchases which have already been made \$19 ought to be high enough; beyond that figure would probably invite a break later on.

Pig Iron.—It is out of the question to quote very close

prices in times like these. Buyers are determined to buy Iron at some price, although if the scarcity is as great as claimed it may be a physical impossibility to get delivery. Those who possess their souls in patience may therefore be as well off in the long run as those who manage to get their orders entered. Ultimately there will be plenty of Iron to go round, and it is by no means improbable that in a few weeks' time things will look materially different from what they do to-day. Nevertheless we must take conditions as we find them, which, as we have already said, are in a considerable state of confusion and we might say excitement. Brought down to actual figures the usual asking price for No. 2X Foundry is \$19.25, although some are willing to accept \$19, and in special cases they might do even better than that. There is nobody anxious to sell Iron, however, and for the moment the trend of prices is distinctly upward. Whether anything will occur to check the movement is a question, although anything might happen in times like these. Mill Irons are also very strong and are quoted at \$16.50 to \$16.75 for ordinary grades and at \$17.25 to \$17.50 for those of a better class. Of course prices will vary, according to locations and conditions, but the figures named are about the basis on which business has been done during the past two or three days for Philadelphia and nearby deliveries. The demand for Basic Iron is less vigorous than it was during the previous two weeks, although there are inquiries for lots aggregating probably 20,000 tons, but the pressure for this class of Iron has sensibly abated. Sales for the last quarter have been on the basis of \$17.90 to \$18, delivered, in one case a trifle more than \$18 having been paid for a 2000-ton lot. Low Phosphorus is in demand, and although small lots comprise most of the business, some of considerable importance are inquired for. There is very little domestic Iron available, although at about \$23.75, furnace, some might be secured for the last quarter. The main dependence appears to be on imported material, however, which can be had at about \$24, f.o.b. cars seaboard, and possibly 50 to 75 cents less for cargo shipments. The following figures fairly represent to-day's market, which, however, is very unsettled and liable to sudden, although probably not very important, changes:

No. 1 X Foundry.....	\$19.50 to \$19.75
No. 2 X Foundry.....	18.75 to 19.25
No. 2 Plain.....	18.25 to 18.75
Standard Gray Forge.....	17.00 to 17.50
Ordinary Gray Forge.....	16.50 to 16.75
Basic.....	18.00 to 18.10
Low Phosphorus.....	24.50 to 24.75
Malleable.....	19.00 to 19.25
Bessemer.....	20.25 to 20.50
Lake Superior Charcoal.....	21.00 to 22.00

Steel.—Business is abundant, and makers have all they can do to keep up with the demand. Forging Billets are specially strong and readily command \$32.50 to \$33.50 for prompt shipments. Ordinary Billets command \$29 to \$29.50, the inside price being for large orders.

Steel Alloys.—The market is irregular, but quotations are given at about the following figures: 20 per cent. Spiegel, \$85 to \$35.50; Ferrosilicon, \$95 to \$98; Ferromanganese, August or September shipment, \$85 to \$90; last quarter, \$80 to \$82, or first quarter 1907, \$77.50.

Plates.—There is nothing out of the usual routine, but the inflow of orders is so continuous that mills are carrying more work on their books than they have done at any previous time. This is the more satisfactory because it includes all kinds of work and from all districts, showing that employment is general throughout the entire country. The scarcity of labor is felt in some quarters, and it is safe to say that the mills have about as much business as they can manage, with every reason to expect its continuance for an indefinite period. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.73½	1.78½
Flange or Boiler Steel.....	1.83½	1.88½
Marine.....	2.13½	2.18½
Locomotive Firebox Steel.....	2.23½	2.28½
The above are base prices for ¼-in. and heavier. The follow- extras apply. Extra per 100 pounds.		
3-16-in. thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Structural Material.—The situation presents no new features. Business is as good as it is possible for it to be, and while there have been times when deliveries were harder to get the tonnage is doubtless the heaviest on record. New mills find plenty to do, and through the relief which they have been able to furnish much inconvenience has been avoided in the matter of deliveries. Prices are firm and unchanged, as follows: Beams, Angles and Channels, 1.83½c. to 2c., delivered.

Bars.—The unsettled condition at several of the local mills is somewhat disturbing, but it is hoped that the differ-

ence will be arranged in the near future. The weather has favored the men somewhat, as they might not have worked, even if there had been a compromise, but recent events will probably favor the manufacturers, as the Susquehanna Iron & Steel Company's men have refused to agree to the Amalgamated Association's suggestions. There is plenty of Bar Iron to be had, however, at 1.63½c., although at the monthly meeting to be held on Thursday it is possible that a slight advance will be made. Steel Bars are scarce and it is difficult to get prompt shipments unless by paying a premium.

Sheets.—There is an excellent demand at about the following prices for medium sized lots, and a tenth less for mill shipments: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market for Scrap is very strong and in most cases sellers ask more money than last week, bids and offers for deliveries in buyers' yards being about as follows:

Steel Crops.....	\$16.75 to \$17.00
No. 1 Steel Scrap.....	16.50 to 17.00
Low Phosphorus Scrap.....	21.00 to 21.50
Old Steel Axles.....	20.75 to 21.25
Old Iron Axles.....	27.00 to 28.00
Old Iron Rails.....	21.00 to 22.00
Old Car Wheels.....	16.75 to 17.25
Choice Scrap, R. R. No. 1 Wrought.....	19.50 to 20.50
Choice No. 1 Yard Scrap.....	17.50 to 18.00
Long and Short.....	16.00 to 16.50
Machinery Scrap.....	16.50 to 17.00
Wrought Iron Pipe.....	14.50 to 15.00
No. 1 Forge Fire Scrap.....	13.50 to 14.00
No. 2 Light Ordinary.....	10.00 to 11.00
Wrought Turnings.....	12.75 to 13.25
Axle Turnings, Choice Heavy.....	13.00 to 13.50
Stove Plate.....	11.75 to 12.25
Cast Borings.....	10.00 to 10.50

Birmingham.

BIRMINGHAM, Ala., August 12, 1906.

Pig Iron.—The Sloss-Sheffield Steel & Iron Company re-entered the market the past week and reports sales since August 1 aggregating more than 30,000 tons for last quarter delivery at prices ranging from \$14 to \$14.50 on No. 2 Foundry basis. Other companies report all the business booked at \$14 that they care to take on at this price and are now quoting \$14.50. No Iron for immediate shipment is available, except low grades, and only a very little of that can be had at the present time. The furnaces, however, are not sold up on the lower grades, and melters of that kind of Iron are experiencing little difficulty in placing orders for future delivery. Some inquiries have been received for delivery during the first half of 1907, but are meeting with very little encouragement from producers. There is considerable difference of opinion among the manufacturers here as to the ultimate outcome of the Iron situation. That the supply of Foundry Iron is inadequate at the present time to supply the enormous consumption is manifest to all, but experience has taught that excessive prices are not the most profitable in the long run, on account of the inevitable reaction, and for this reason the more conservative producers are arguing against a higher price than \$15, while others are doing all in their power to boost the market still higher. The production for August will show an improvement over the past few months in this district, as several additional furnaces are now in blast. The hot weather has done much to retard production here and more furnaces have been out of blast this summer than usual. A number of the stacks which have been undergoing repairs will soon be ready for business again, and it is very probable that Alabama will break all records for production during the remaining months of the year.

The Alabama Consolidated Coal & Iron Company has decided to completely overhaul the stoves supplying the furnace it has been rebuilding at Gadsden for the past several months, as a consequence of which the furnace will not be blown in until about November 1. When completed this will be practically a new furnace, having been rebuilt in every department.

The Lacey-Buek Iron Company will be unable to get its Trussville Furnace back in operation before September 1, on account of delay in receiving material for relining.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company has been awarded the contract for the requirements of Kansas City, Mo., for 1906-'07, amounting to 5000 tons. Foundries in this district announce that, owing to the advance in Pig Iron, scarcity of labor and the urgent demand for their product, they have been forced to advance prices and are now quoting as follows on Water Pipe: 4 to 6 inch, \$30; 8 to 12 inch, \$29; over 12 inch, \$27.50, with \$1 per ton extra for Gas Pipe.

Old Material.—The demand for Cast Scrap is increasing and an advance of from 75 cents to \$1 per ton is reported over last week. Dealers have very small stocks and are unable to supply the demand. The Wrought Scrap market continues quiet, but there is a better feeling existing and dealers are expecting a resumption of activity at an early

date. Quotations are approximately as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$18.50 to \$19.00
Old Iron Axles.....	18.00 to 18.50
Old Steel Axles.....	16.00 to 17.00
Old Car Wheels.....	16.50 to 17.00
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 2 Railroad Wrought.....	14.00 to 14.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	11.00 to 11.50
Wrought Pipe and Flues.....	11.50 to 12.00
Railroad Malleable.....	12.00 to 12.50
No. 1 Steel.....	11.00 to 11.50
No. 1 Machinery Cast.....	12.00 to 12.50
Stove Plate and Light Cast.....	9.00 to 9.25

Cleveland.

CLEVELAND, OHIO, August 14, 1906.

Iron Ore.—On Saturday of last week one of the big boats in a collision with a drawbridge at Duluth knocked it down and obstructed navigation for a short time. A number of boats laden with ore were not able to get away and other boats going to Duluth for loads were compelled to lie outside. While this was not as serious a menace to navigation as a grounding in the Soo River, it nevertheless stopped the movement of ore from the principal shipping port at the head of the lakes long enough to have some influence on the movement at a time when delays could ill be afforded. The shippers at the present time are in a race. They want to get as much ore down as possible before the movement of grain becomes heavy. The grain movement this year is going to interfere more than usual with the ore movement. The statement is now made that it will require an active movement of vessels and mines to duplicate last year's movement of practically 34,500,000 tons. This revision of the estimated shipments is forced by the scarcity of labor, both on shipboard and at the mines. This has been complicated during the past week by general advertisements of a northwestern Canadian railroad for 20,000 men to work in the harvest fields and to take up land in the Canadian Northwest. This demand is stripping the lakes and the mines of their labor supply. For the present the lake market is steady, with rates based on 75 cents from Duluth to Ohio ports. These will be advanced in the near future.

Pig Iron.—There is such an extreme shortage of Iron for prompt shipment in this territory that furnace interests are at a loss to advise their customers where an available supply might be had. The Valley furnaces and those in the Cleveland District have been sold up for some time. The supply has latterly been coming from the Buffalo District and southern Ohio, but those furnaces are now out of the market. Even the Southern furnaces are refusing to quote for Cleveland delivery. It would be idle to attempt under the circumstances to quote the price of Iron for spot shipment. It would, however, be impossible to get any as low as \$18, at the furnace. A number of the consumers in this territory who have been relying on the open market for their material are facing a shortage of Iron and fancy prices during the fall. No relief is offered from this condition before the end of the year. The result has been an impouring of unsolicited orders for the first quarter and through the first half of next year. This buying has been so heavy that one furnace company notified its representatives during the week to accept no contracts of good size without first asking the company. Others are comfortably sold up for the remainder of the year and for the first quarter. The prices now being freely paid for future delivery range from \$18 up. The policy is now to charge what the market will stand, in marked contrast with the recent conservatism on the same subject. The expression is general that this policy is dangerous, but seems unavoidable.

Coke.—The Coke market is equally strong. Two of the biggest producers have announced their withdrawal from the market for the remainder of the year and are willing to take contracts for the first half of next year only at an advance. While quotations are \$3.25 to \$3.50 at the oven, the latter is the ruling price for 72-hr. Foundry Coke at the ovens, with \$2.75 to \$3 named for Furnace.

Finished Iron and Steel.—Reports of a most optimistic character are constantly coming to the office of the Steel companies. It is a common occurrence to find small concerns taking much larger orders than they have ever before been able to handle. Shops consuming Steel are showing the biggest business they have ever had. This situation has completely eliminated the weak spots from the market. The demand coming from these sources has also congested the mills in spots, making deliveries possible only at a longer period in the future. As to specific conditions the American Shipbuilding Company during the week took another order for a 10,000-ton steamer, which will require about 4000 tons of Structural Steel and Plates. This makes 20 boats in all contracted for with this company for 1907 delivery, or enough to keep the company actively employed until the end of September, 1907, when taken in consideration with boats already on the stocks. Six more boats are being planned, however, and the orders will be distributed

among other yards in a short time. The Plate market has been strengthened by this situation and deliveries are possible only after a considerable delay. The buying of Structural Shapes from the smaller mills at premium prices has been resumed on a small scale. Sheets are so strong that deliveries are promised only in 10 weeks. Prices have stiffened, but have not advanced. Bar Iron is much stronger. The situation recently was weak, but now it is impossible to get much Iron at 1.50c., the official price, and those having it for sale are asking 1.60c., Pittsburgh. Forging Billets are strong at \$34 to \$35, Cleveland.

Old Material.—The market is strengthening, but prices have not shown any radical advances. The following list represents dealers' prices to the trade, f.o.b. Cleveland, gross tons: Old Steel Rails, \$15; Old Iron Rails, \$21 to \$22; Iron Car Axles, \$18.50 to \$19.50; Heavy Melting Steel, \$15. Net tons: Cast Borings, \$8; No. 1 Busheling, \$12.50 to \$13; No. 1 Railroad Wrought, \$15.50 to \$16; No. 1 Cast, \$14.50; Iron and Steel Turnings and Drillings, \$9.50 to \$10.50.

Cincinnati.

FIFTH AND MAIN STS., August 15, 1906.—(By Telegraph.)

Pig Iron.—The general tone of the market is very strong and prices are advancing day by day. Figures that last week apparently portrayed the high point reached at that time now represent the minimum quotations, and the opinion prevails that the end is not yet in sight. The situation is somewhat peculiar, inasmuch as the available tonnage is constantly decreasing, with a large percentage of consumers not covered for any considerable period. Melters without exception are making persistent efforts to obtain their full quota of Iron on contracts, often with very indifferent results, however. This is largely attributable to the unsatisfactory labor conditions existing in all parts of the country, as well as the congested condition of the railroads entering Southern territory, it being almost impossible to obtain the necessary equipment to handle the business satisfactorily. As matters now stand spot Iron is practically unobtainable even at a premium, instances of which have been reported. Southern No. 2 is to-day quotable from \$14.50 to \$15, Birmingham, and while the minimum figure possible represents the quotation at which the most of the business has been taken, there is no doubt of a number of sales having been made at the higher figure, which it is reasonably safe to predict will within the next few days be well established and represent the ruling quotation on strictly Birmingham Irons. The situation in Northern furnace circles is almost identical with that in the South, prices showing an advance of 50c. over last week's schedule and furnaces being well sold up for the balance of the year. Freight rates from the Hanging Rock district to Cincinnati are \$1.15, and from Birmingham, \$3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$18.00 to \$18.50
Southern Coke, No. 2.....	17.50 to 18.00
Southern Coke, No. 3.....	17.00 to 17.50
Southern Coke, No. 4.....	16.50 to 17.00
Southern Coke, No. 1 Soft.....	18.00 to 18.50
Southern Coke, No. 2 Soft.....	17.50 to 18.00
Southern Coke, Gray Forge.....	15.75 to 16.00
Southern Coke, Mottled.....	15.50 to 15.75
Ohio Silvery, No. 1 (8 per cent. Silicon).....	22.15 to 22.65
Lake Superior Coke, No. 1.....	19.15 to 19.65
Lake Superior Coke, No. 2.....	18.65 to 19.15
Lake Superior Coke, No. 3.....	18.15 to 18.65
<i>Car Wheel Irons.</i>	
Standard Southern Car Wheel.....	\$25.00 to \$25.25
Lake Superior Car Wheel.....	23.50 to 23.75

Coke.—The market is quite active, with prices strong. Considerable Coke has been sold, covering the first half of 1907, at ruling quotations. We quote the best brands of Connellsville and Virginia Foundry at \$3 to \$3.25, f.o.b. ovens.

Finished Iron and Steel.—Quite a heavy increase along Structural lines is noted, and specifications are coming forward in a very generous manner. Contracts for next year's business are now receiving attention and the outlook is strong. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.83c., in carload lots.

Old Material.—In harmony with the advance in Pig Iron the Scrap Iron trade is showing more activity. Dealers are disposing of quite a tonnage and general conditions appear to be very satisfactory. We quote dealers' prices, f.o.b. Cincinnati, about as follows: No. 1 Railroad Wrought Scrap, \$14 to \$14.50 per net ton; Cast Borings, \$5 to \$6 per net ton; Steel Turnings, \$7 to \$8 per net ton; No. 1 Cast Scrap, \$12 to \$13 per net ton; Iron Rails, \$19 to \$20 per gross ton; Steel Rails, rolling mill lengths, \$15 to \$15.50 per gross ton;

Relaying Rails, 56-lb. and upward, \$28 to \$29 per gross ton; Iron Axles, \$21 to \$22 per net ton; Car Wheels, \$17 to \$18 per gross ton; Low Phosphorus Scrap, \$17 to \$18 per gross ton.

Pittsburgh.

PARK BUILDING, August 15, 1906.—(By Telegraph.)

Pig Iron.—The market has been extremely active in Foundry and Bessemer, while Forge and Basic are much stronger in sympathy. The Jones & Laughlin Steel Company bought 30,000 tons of Bessemer from the Bessemer Pig Iron Association at \$17.75, Valley furnace, and the Youngstown Sheet & Tube Company bought 70,000 tons from the same association at the same price, this being the inquiry mentioned last week. Both purchases are for first half delivery. The furnace association has not a great deal of Bessemer left for the first half. Further sales of moderate tonnages have been made for this year at \$18 and \$18.25, depending largely on delivery, and there is very little left for this year. One large inquiry is in the market for first quarter or first half, and may be closed within the week. We quote Bessemer at \$18.25, Valley furnace for any early delivery, \$18 for late this year and \$17.75 for first half next year. Basic has not been active, but there has been a heavy inquiry and furnacemen have marked up prices, and we quote \$17.75 to \$18, Valley furnace, for any delivery. Two inquiries are in the market which will be closed shortly at not under \$17.75. Sales of Foundry Iron have been heavy, and there is scarcely any available for delivery this year, while furnaces are not anxious to quote on next year. We quote No. 2 at \$17.75 to \$18, Valley furnace, for any delivery, noting that some sales for prompt delivery have been made at premiums. Southern No. 2 Iron is \$15, Birmingham, for this year, and \$14.50 to \$15 for next year. We quote Forge at \$17 to \$17.25, Valley furnace. This is the strongest Pig Iron market that has been seen for a long time, all furnaces being practically sold up for this year, with heavy sales for next year and the possibility that some consumers are not fully covered. If there are any interruptions to production this winter fancy prices on prompt Iron will undoubtedly prevail.

Steel.—Deliveries are very unsatisfactory, and prices are almost what one cares to ask. We quote Bessemer Billets nominally at \$28, and Open Hearth \$29 to \$30, with Forging Billets about \$33, and small Billets selling at Merchant Bar price, or \$33.60. Sheet Bars are very scarce, and quoted \$29, f.o.b. Youngstown for late this year, while small lots for prompt shipment have sold \$30 and higher, Pittsburgh. One purchase of a small lot of Open Hearth Steel Bars for deep stamping work was tried at \$32 unsuccessfully, and finally \$33 was paid.

(By Mail.)

The most interesting event of the week has been the opening of the Bessemer Pig Iron market for next year at the price noted in last report as having been decided upon by the Bessemer Furnace Association. The Jones & Laughlin Steel Company has taken 10,000 tons monthly from the association for the first quarter, and other buyers have taken in the neighborhood of 20,000 tons for the first quarter and first half at the same price, making a total of 50,000 tons or so for 1907 at \$17.75, Valley furnace, and thoroughly establishing the market at this figure. Two large Valley consumers are figuring on large tonnages for delivery in the first half and will probably close this week. Sales are being made for this year at \$18.00 and \$18.25, one of these being 3000 tons for fourth quarter to an Eastern acid open hearth steel maker, at \$18.25, Valley furnace. Basic has also been sold for next year. Buyers of Ore are asking the producers to fix prices for next year now that the Pig Iron market has opened, and while the latter are averse to such early action there are hopes that they will yield and fix prices before the end of September.

The Carnegie Steel Company has bought 6000 tons of Heavy Melting Scrap for August delivery at Munhall at \$16.50, delivered, in addition to the 5000 tons noted last week. Some first half Bessemer Pig is still due the United States Steel Corporation, and some of this is being delivered to Joliet. One of the accounts will probably be closed this month and the other next month.

The scarcity of Crude Steel is still more acute. Small Billets are scarcely obtainable as such, as we note the sale of several thousand tons of 2-in. and 1½-in. Bessemer Billets at the Bar price of 1.50c., or \$33.60 per gross ton, which are being rolled on merchant Bar bills.

Ferromanganese.—Sales have been heavier, and several large consumers are still in the market. We quote early deliveries at about \$90, and deliveries later in the year at \$80 to \$85.

Wire Rods.—Deliveries are not altogether satisfactory, the Rod mills being short of Billets. We quote Bessemer and Open Hearth Rods at \$34, and Chain Rods at \$35, Pittsburgh.

Skelp.—Specifications continue good on old contracts, but there is little new business, producers being so well filled up. We continue to quote prices, as follows: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Structural Material.—No large business is being figured on, but there is a good run of small business, and mills are well filled into next year. We quote prices firm and unchanged, as follows: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—There is a fair run of small orders, which with the heavy forward business already placed assures the large Plate mills a full run for several months. We continue to quote: Tank Plates, ¼ in. thick, 6¼ in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 lb.
Gauges lighter than ¼ in. to and including 3-16 in.	
Plates on thin edge	\$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—With a still greater scarcity of Sheet Bars the independent mills are becoming very anxious to see an advance, but can hardly take the initiative. New business is moderately large, while specifications continue very good on old contracts. Prices are very firm, as follows: Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.65c., and No. 30, 2.75c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.80c., and No. 30, 4.05c. We quote No. 28 Gauge Painted Roofing Sheets at \$175 per square, and Galvanized Roofing Sheets, No. 28 gauge, at \$3.10 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Bars.—It is hinted that while the recent advance by the Cambria Steel Company to 1.60c. for Steel Bars is not in itself indicative of a market movement, as this company has at times in the past advanced its price above the general market, it is quite possible that the other mills may individually mark up their prices within the next 30 days or so and establish a regular market of 1.60c. on Steel Bars. Meanwhile we quote Steel Bars very firm at 1.50c., Pittsburgh, with specifications heavy and new buying of moderate volume. The advanced Bar Iron price of 1.60c., Pittsburgh, of the Republic Iron & Steel Company has not become the market, but the whole tone is firmer and business is better. We quote Iron Bars at 1.55c. to 1.60c. for actual Pittsburgh delivery, and 1.50c. to 1.55c., Pittsburgh, for shipment outside.

Hoops and Bands.—Specifications on contracts are good and some new business is coming in. We quote Steel Hoops at 1.90c. and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Tin Plate.—The demand for prompt Tin Plate has further improved, and consumers are gradually beginning to show more confidence in the market and inquiring farther ahead. The independent producers are far from satisfied with the situation, as with the continued high price of Tin and the increased scarcity of Sheet Bars there is little if any profit in the business. Some producers are not running, preferring to buy in the market such Tin Plate as they absolutely must have. The independent mill noted last

week as likely to resume in September, will not resume even then unless there is a decided change in conditions. The leading interest has started the eight idle mills at the Greer plant, New Castle, and is operating almost exactly 75 per cent. of its 252 Tin mills. The independents are operating about one-fourth as many mills. We quote Tin Plate at \$3.75 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carloads and larger lots.

Railroad Spikes.—Buying for next year continues very heavy, and there is also some buying for this year. We quote prices for forward delivery at \$2.20 to \$2.25 per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—Conditions are quite satisfactory, but without special incident. Prices are firm, as follows: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish, up to 1½ x ½ in., 1.65c., and Iron Finish, 1½ x ½ in. and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ¾ and 1 in., 2c., and 1½ in. and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.75c. to 1.80c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Spelter.—While the market has been quiet the past week prices have advanced, and we quote the market to-day firm at 6.05c., delivered, Pittsburgh, or 5.92½c., St. Louis, for Prime Western.

Merchant Pipe.—The demand continues good, with mills well filled up for 30 to 60 days on Merchant Pipe and for a longer period on some sizes of Line Pipe. The extreme discount on Merchant sizes of Steel Pipe remains at 81 and 5 per cent. off, to the large trade. Official discounts for carloads, which continue to be shaded one point or more, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Steel.	Galv.	Black.	Galv.
1/2 and 3/4 in.	72	56	69	53
3/4 in.	74	60	71	57
1 in.	76	64	73	61
5/8 to 6 in.	80	70	77½	67½
7 to 12 in.	75	60	72½	57
Extra strong, plain ends:				
1/2 to 3/4 in.	65	53	62	50
3/4 to 1 in.	72	60	69	57
1 to 2 in.	68	56	65	53
Double extra strong, plain ends:				
1/2 to 3/4 in.	61	50	58	47

Boiler Tubes.—There is a fairly good demand, with no more unevenness in prices than there was. Prices are fairly firm, but are sometimes shaded on certain sizes. Discounts in carloads are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	45	50
1½ to 2¼ in.	45	62
2¼ in.	50	64
2¼ to 5 in.	57	70
6 to 13 in.	45	62

Iron and Steel Scrap.—Following the purchase of 5000 tons of Heavy Melting Scrap by the Carnegie Steel Company, noted last week, the company has taken about 6000 tons more, making a total of about 11,000 tons for August delivery at Munhall at \$16.50, delivered. These purchases were distributed among five or six dealers. The company proposed a conversion arrangement with another Steel interest for Billet and Bloom Crops, but no deal was put through. It does not appear to be in the market for any more August Scrap, but may buy for September, if it can buy at such low prices compared with Pig Iron. Other consumers of Melting Scrap are not actively bidding, but would probably pay a little more than they would a fortnight ago. The demand from rolling mills and foundries has improved. Dealers are very confident of the future, but are endeavoring to accumulate material at as low prices as possible. The inquiry for 1500 to 2000 tons of Low Phosphorus Scrap by a local consumer, noted in last report, resulted in 1500 tons being bought at slightly under \$19. We quote the market decidedly firmer, and some prices higher, as follows: Heavy Melting Scrap, \$16 to \$16.50; Low Phosphorus, \$18.50 to \$18.75; Bundled Sheet Scrap, \$14 to \$14.25; No. 1 Wrought Scrap, \$17.25 to \$17.50; Machinery Cast Scrap, \$15.50; Cast Iron Borings, \$9 to \$9.25; Old Steel Rails, short pieces, \$16.25 to \$16.50; Old Steel Rails, rerollers, \$17.25 to \$17.50; Axle Turnings, \$12.50; Stove Plate, \$10.25 to \$10.50; Wrought Turnings, \$11.50 to \$11.75—all in gross tons, f.o.b. Pittsburgh.

Coke.—The scarcity of labor is still more pronounced in the Coke regions, and many operations cannot run full. Coke is very scarce and readily commands full prices. We quote strictly Connellsville Furnace Coke at \$2.75, and 72-hour Foundry at \$3 to \$3.10, at ovens.

Charles Neidhart, Jr., has purchased the interest of his partner, Louis Steinfirsh, in the business which they here-

fore conducted under the name of the Keystone Iron & Metal Company, dealing in Scrap Iron, Steel and Metals, at McKees Rocks, Pa., and will continue the business under the firm name as above given.

Metal Market.

NEW YORK, August 15, 1906.

Pig Tin.—The week has been most interesting, with the spot market strong and showing a rising tendency. Owing to a delay in shipments from London the arrivals here this month will probably be very small, and in consequence of it holders are maintaining a very stiff attitude. Asking prices are placed at a high figure, which is fully £7 to £9 above London spot prices. In this market on Monday spot sales were made at 40.75c. and Tuesday there were liberal sales of spot as high as 41.50c., but it was soon found, however, that there were many sellers in the market at that figure. In a very small way, say in ton lots, 41.75c. was the highest paid. The local market to-day was fairly active, with prices at the close of business 41.30c. to 41.75c. for spot deliveries, 40.12½c. to 40.37½c. for August, 39.50c. to 40c. for September and 39c. to 40c. for October. The market closed firm for spot and easy for future deliveries. The scarcity of spot and nearby Tin, which appears to be getting more acute every day, is due to the fact that there can be no arrivals of consequence before the steamer Minnetonka reaches port, and she, sailing from London on Saturday, will in the regular course reach this port on August 27. It is expected she will bring in about 1000 tons of the metal. The arrivals here thus far are 1311 tons and the afloats 1266 tons. The London market this morning opened a trifle easier at £187 6s. 6d. and futures £182 6s. 6d., which figures, however, are an advance as compared with last week. The closing quotations were £180 7s. 6d. for spot and £180 2s. 6d. for futures.

Copper.—The market for this metal shows a trifle firmer tendency and the undertone is good. There is a fair demand for nearby deliveries, especially August and September, for which months premiums of several points are said to have been paid. The largest producer is practically out of the market for August deliveries. The conditions, however, influencing the general situation remain much the same as last week, and holders are inclined to be optimistic as to the future. Additional exports for the month of July included 200 tons from a Southern port and 600 tons from Pacific ports, making a total for the month of 18,309 tons, as compared with 18,478 tons in the corresponding period of last year. The exports thus far the present month are 7222 tons. The quotations of the New York Metal Exchange, which are given on a net cash basis, are as follows: Lake, 18½c. to 18¾c.; Electrolytic, 18¾c., and Casting, 18c. to 18¼c. The London market to-day closed as follows: Spot, £83 10s.; futures, £83 5s., and Best Selected, £88.

Lead.—There has been no change in the situation since last week, and we continue to quote New York at 5.75c. and St. Louis 5.65c. London, however, is somewhat firmer, and shows at £17 a slight advance as compared with a week ago.

Spelter.—There is a trifle stronger tone to the market, and with a large consumption it is expected that prices will stiffen later in the year. At present quotations remain at 6.05c. to 6.10c., with St. Louis unchanged at 5.90c. London cables are £26 17s. 6d.

Antimony.—Conditions in the local market may be said to have improved slightly during the week under review, owing to the very small arrivals from Europe. This condition, however, it is expected will soon be equalized, as Europe will shortly commence shipping the material on a larger scale. At present there is only a temporary scarcity in the market. Cookson's is quoted at 23c. to 24c., Hallett's at 23c., and other grades can be had at slightly lower figures, according to brand.

Aluminum.—While the demand is fairly well maintained there has been no change in prices since the July list was published by the leading producer, and No. 1 Ingots are held at 36c. and No. 2 Ingots at 34c. per lb.

Quicksilver.—Flasks of 75 lb. in lots of 100 flasks are quoted at \$41 per flask. Small lots can be had at \$41.75 to \$42. London is a trifle easy.

Nickel.—Large consumers are quoting 45c. to 50c., but the metal in small quantities can be obtained at 55c. to 65c.

Tin Plate.—The demand keeps up remarkably well, and it is certain that the production this year will be the largest on record. The building situation has been so extraordinary as to aid materially in creating an enormous consumption, but the difficulty in obtaining Steel has tended to delay deliveries which are fully as far behind specifications as was indicated in our last issue. Prices, however, remain unchanged at \$3.94, f.o.b. New York, and \$3.75, f.o.b. Pittsburgh, subject to the usual trade discount. The Swansea market holds the slight advance noted last week at 12s. 9d.

Old Metals.—The market may be described as steady with a fairly good demand for Lead and Zinc, and an active

inquiry for Composition Metal. Quotations, however, remain practically the same as last week, and dealers selling prices may be quoted as follows:

	Cents.
Copper, Heavy Cut and Crucible.....	17.75 to 17.87½
Copper, Heavy and Wire.....	17.50 to 17.75
Copper, Light and Bottoms.....	15.75 to 16.00
Brass, Heavy.....	12.00 to 12.25
Brass, Light.....	9.75 to 10.00
Heavy Machine Composition.....	15.75 to 16.00
Clean Brass Turnings.....	11.00 to 11.25
Composition Turnings.....	13.50 to 13.75
Aluminum Scrap.....	26.00 to 28.00
Lead, Heavy.....	5.20 to 5.35
Tea Lead.....	5.00 to 5.20
Zinc Scrap.....	4.40 to 4.60

New York.

NEW YORK, August 15, 1906.

Pig Iron.—The early buying for 1907 was well launched in the past week. Lots of 2000, 1000 and 500 tons were freely taken on a rising market, though considering the scarcity of spot and early delivery Iron the moderate extent of the advance is noteworthy. New England foundries have been good buyers, and in that section and in territory tributary to New York and Philadelphia it is estimated that 80,000 to 90,000 tons has been taken. Their inability to get Iron for early delivery is a surprise to some consumers. The Steel Corporation's purchases of Basic Iron for Pencoyd, Pa., amounted to 13,000 tons, at from \$17.50 to \$18, delivered in the fourth quarter. More Basic Iron is wanted. We revise quotations as follows: Northern No. 1, \$19.50 to \$20; No. 2, \$19.25; No. 2 Plain, \$18.75 to \$19, tidewater. Southern Iron is selling at \$19 to \$19.50 for No. 1, and from \$18.50 to \$19 for No. 2, freight from Birmingham to New York being \$4.

Steel Rails.—Business is light, the vacation season preventing action on pending requisitions. The one sale reported for 1907 is 2100 tons for the Northern Indiana Railroad. Miscellaneous lots for 1907 delivery amount to 8000 tons. For 1906 delivery miscellaneous small sales, footing up 5000 tons, are reported.

Structural Material.—The principal local contract of the past week is the new warehouse in Brooklyn of Abraham & Straus, which will require 3000 tons of Steel. It was taken by Milliken Brothers. In general, Structural contracting has fallen off considerably, and apart from a few well-known and important jobs that have long been in contemplation, but the plans for which have not yet been given out, the local prospect is not what it was. The fact seems to be that the railroads have placed about all the bridge work they expect to have done this year. It would be impossible to secure deliveries this year on any such business placed now except for small tonnages. Jobbers and other buyers of Structural Material for stock are ostensibly covered to the end of the year, although it is considered probable that orders of this character may be increased in the late fall. We continue to quote as follows for tidewater delivery on mill shipments: Beams, Channels, Angles and Zees, 1.84½¢; Tees, 1.89½¢; Bulb Angles and Deck Beams, 1.99½¢. On Beams 18 to 24 in. the extra is 0.10¢, and on Angles over 6 in., 0.10¢. Beams and Channels out of stock are sold at 2.40¢ to 2.50¢.

Bars.—Sales agents report an active trade in both Iron and Steel Bars, with prices not only firm, but showing a tendency to advance. Bar Iron makers are quite numerous quoting 1.60¢, Pittsburgh, or 1.74½¢, tidewater, although some are still taking business at 1.64½¢. The strike among the Eastern rolling mills has shown no change during the week, both sides apparently being very firm in maintaining their former positions. Unsuccessful efforts have been made to induce workmen in other mills to strike. A meeting of the Eastern manufacturers will be held in this city on Thursday of this week to consider the general situation. It is not expected, however, that prices will be changed. Steel Bars continue to be quoted at 1.64½¢, tidewater, but the demand is very heavy and deliveries are not made so promptly as during the spring months.

Plates.—Only a moderate business is reported in Sheared Plates in this vicinity. Local conditions are not yet favorable to increased business. Mills, however, are well supplied with work and prices are firmly maintained. Mill shipments are quoted as follows at tidewater: Sheared Tank Plates, 1.74½¢ to 1.84½¢; Flange Plates, 1.84½¢ to 1.94½¢; Marine Plates, 2.14½¢ to 2.24½¢; Fire Box Plates, 2.24½¢ to 2.60¢, according to specifications.

Cast Iron Pipe.—Orders are now being taken for spring delivery, being the earliest ever known for transactions of this kind. The demand is extraordinary, buyers urgently beseeching manufacturers to furnish Pipe greatly needed this fall. It is impossible to secure any, however, owing to the crowded condition of the foundries. The Philadelphia letting, which was expected to take place August 8, has again been postponed. Nominal prices on carload lots of 6-in. are \$31 to \$32, tidewater, but premiums of several dollars could be had if any stock was available for prompt shipment.

Old Material.—The demand for Heavy Cast Scrap is urgent, but very little is to be had in this vicinity at any price. The demand has correspondingly increased in Stove Plate, but this class of material has not advanced in sympathy with other grades. An error was made in this report in last week's issue in stating that \$16.50 had been paid for Heavy Cast Scrap, as it appears that while the sale was made at the price stated it included freight of \$1 per ton, making the price \$15.50, New York. The same error occurred in giving the details regarding a sale of Stove Plate, which also included \$1 per ton freight, making the New York price \$10.50. The demand has materially improved for No. 1 Wrought Scrap and quite a quantity has been disposed of at an average of 50¢ per ton above the price prevailing two weeks ago. Inquiries are in hand for several lots of Steel Scrap aggregating about 10,000 tons, but as the accumulation in this vicinity is very light the prospective buyers have not been successful in placing their orders. An embargo is still in force at the Worth Steel plant, preventing deliveries by dealers having contracts for materials, but all other works which has been suffering from embargoes are now receiving shipments regularly. The market in general is in a very healthy condition and if the strike among the Eastern rolling mills should soon be settled it is expected that the price of Rolling Mill Scrap will go considerably higher, as a result of the increased consumption. The situation in Basic Pig Iron in the Eastern market justifies the impression that Steel Scrap will command much better prices before the middle of September. Quotations for New York and vicinity are approximately as follows:

Old Iron Rails.....	\$20.50 to \$21.00
Relaying Rails.....	26.00 to 26.50
Old Steel Rails, rerolling lengths.....	16.50 to 17.00
Old Steel Rails, short pieces.....	15.00 to 15.50
Heavy Melting Steel Scrap.....	15.00 to 15.50
Standard Hammered Iron Car Axles.....	26.00 to 26.50
Old Steel Car Axles.....	20.00 to 20.50
No. 1 Railroad Wrought.....	18.50 to 19.00
Iron Track Scrap.....	16.50 to 17.00
No. 1 Yard Wrought, long.....	16.50 to 17.00
No. 1 Wrought Scrap, short.....	15.50 to 16.00
Wrought Pipe.....	12.00 to 12.50
Light Iron.....	9.50 to 10.00
Cast Borings.....	8.50 to 9.00
Wrought Turnings.....	11.00 to 11.50
Old Car Wheels.....	14.00 to 16.50
No. 1 Machinery Cast.....	15.00 to 15.50
Stove Plate.....	10.50 to 11.00
Grate Bars.....	9.50 to 10.00
Malleable Cast.....	15.00 to 15.50

Wm. Dette and George A. Crocker, Jr., were admitted on July 24 to partnership in the firm of Crocker Brothers, 99 John street, New York. Mr. Dette has had an extensive experience in the Eastern pig iron trade, particularly in Philadelphia and New York. George A. Crocker, Jr., is the son of the senior partner in Crocker Brothers, and his business training has been in that office.

Iron and Industrial Stocks.

NEW YORK, August 15, 1906.

A reaction in the stock market had some effect on prices during the past week, but it was of short duration, and in most instances prices on active stocks recovered their loss by Monday or Tuesday of this week. On Tuesday United States Steel common touched 41½, making a new high record for this movement. The range of prices on leading industrials from Thursday to Tuesday, inclusive, was as follows: United States Steel common 39½ to 41½, preferred 105 to 106½; Car & Foundry common 37½ to 39½; Locomotive common 68 to 69½; Colorado Fuel 52 to 55½; Pressed Steel common 50½ to 53; Railway Spring common 52½ to 53½; Republic common 28½ to 29½, preferred 98½ to 99; Sloss-Sheffield common 75 to 77½; Tennessee Coal 154½ to 155½; Cast Iron Pipe common 47½ to 47½, ex-dividend. Last transactions in active stocks up to 1.30 p.m. to-day are reported at the following prices: Can common 8, preferred 59½; Car & Foundry common 39½, preferred 101; Locomotive common 70½, preferred 113½; Steel Foundries common 10½, preferred 45½; Colorado Fuel 55½; Pressed Steel common 53, preferred 98½; Railway Spring common 53½; Republic common 29½, preferred 99½; Sloss-Sheffield common 77½; Tennessee Coal 155½; United States Cast Iron Pipe common 47, preferred 93½; United States Steel common 41½, preferred 106½.

The Chicago Pneumatic Tool Company's income account for six months ended June 30, compares as follows with the corresponding period of the previous year:

	1906.	1905.
Net earnings.....	\$457,483	\$413,941
Less depreciation, repairs, &c.....	70,742	57,705
Balance.....	\$386,741	\$356,236
Bond interest.....	57,500	57,500
Balance.....	\$329,241	\$298,736
Sinking fund reserve.....	25,000	25,000
Surplus available for dividends.....	\$304,241	\$273,736
Dividends.....	122,175	122,275
Surplus for six months.....	\$182,066	\$151,461

The company's total surplus is now \$693,358. President Duntley says: "Unfilled orders on hand at present are greatly in excess of any previous time since the company's organization. This in connection with the increasing factory facilities and new tools developed, which are about to be marketed, makes prospects look encouraging for the balance of the year."

At the annual meeting of the stockholders of the National Enameling & Stamping Company just held, the figures covering the operations for the year ending June 30 were given out. The statement shows gross earnings of \$1,576,396, net earnings of \$948,258, and a surplus after all dividends and charges of \$272,710.

Trade Publications.

Bolt Cutters.—National Machinery Company, Tiffin, Ohio. Bulletin No. 20. Takes up the subject of the National multiple spindle bolt cutters, giving illustrations of the various types and sizes. These include $\frac{1}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2 and $2\frac{1}{2}$ in. double bolt cutters, $1\frac{1}{2}$ and 2 in. triple bolt cutters, a $1\frac{1}{2}$ -in. double stay bolt cutter and double nipple threading and reaming machines, built in $\frac{1}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 in. sizes. Succeeding pages illustrate and describe the head, new interchangeable die and plain case die, and contain specifications covering the principal features. The concluding pages show an electrically driven bolt cutter, and give tables of the various sizes and types.

Wire Rope.—Broderick & Bascom Rope Company, 805 North Main street, St. Louis, Mo. Price-list G. This is considerably larger than the company's last issue, and contains short articles on logging, underground wire rope haulage, aerial wire rope tramways, splicing, suspension bridges and illustrations show different construction of wire rope. Data is also given concerning Powersteel rope, and considerable useful information which will be of interest to engineers and users of wire rope. In addition to the rope itself, accessories such as sockets, thimbles, hooks, shackles, sheaves, pulley blocks, &c., are listed.

Steam Shovels, Dredges, &c.—Toledo Foundry & Machine Company, Toledo, Ohio. Catalogue. Size, 6 x 9 in.; pages, 81. This is an illustrated catalogue covering particularly steam machinery which may be used to replace hand labor for all kinds of excavating and rehandling of material. The machines included are Victor steam shovels and dipper dredges, land dredges, centrifugal pumps and railroad pile drivers. A special interest attaches to the catalogue from the large number of illustrations of good size, showing machines of the various types in operation.

Grinding Wheels and Machines.—Vitrified Wheel Company, Westfield, Mass. 1906 catalogue. Size, 6 x 9 in.; pages, 64. The foreword concerns the process of making emery and corundum wheels by vitrification, and tells something of the qualities of vitrified corundum wheels, vitrified emery wheels, cyclone brand or elastic wheels and silicate wheels. Succeeding pages give diagrams of the shapes, special and standard, in which the wheels are made for various purposes. A grade list is also given and explained, and a price-list follows. Three styles of emery wheel dressers are illustrated and described, and the succeeding pages give diagrams and dimensions of some of the special shaped wheels that are used on Brown & Sharpe and Landis grinding machines and others. The last section of the catalogue pertains to grinding machinery, showing three sizes of bench grinders and three sizes of grinders on columns. Tool and drill grinders and other special grinding machines are also shown.

Electric Controlling Apparatus.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Bulletins, telegraphic code and index. No. 24 gives dimensions of compound starting and regulating rheostats; Nos. 33, 34 and 35, self-starters for alternating current motors of the squirrel-cage and slip-ring types; No. 42, universal motor speed regulators; No. 44, description of compound speed regulators; Nos. 81 and 83, inclosed nonreversible compound controllers, and No. 88 $\frac{1}{2}$, inclosed nonreversible compound controllers.

Pumps.—Smart-Turner Machine Company, Limited, Hamilton, Canada. Catalogue No. 6. Deals with steam and power pumps, illustrations and brief descriptions being given of packed piston pumps, center packed plunger pumps with pot valves, automatic feed pumps and receivers, compound duplex pumps, jet condensing apparatus, triplex power pumps, duplex double acting power pumps, and centrifugal pumps, with brief specifications, dimensions, &c. A little useful information is included, and testimonial letters are appended.

Air Appliances for Railway Service.—Ingersoll-Rand Company, New York. Pamphlet. Shows Corliss engine-driven compressors; straight-line compressors; duplex compressors, steam and power driven; pneumatic hammers; drills, pumping systems and rock drills, and in general the company's products that will interest railroad men.

Engines and Boilers.—Edwin H. Ludeman & Co., 42 Broadway, New York City. Sectional catalogue. Size, 8 x 10 $\frac{1}{2}$

in. The first section deals with the Fitchburg engine, a four valve engine without dash pots or releasing gear, made in girder and tangye patterns. A smaller single valve high speed engine is also made. A full description is given of the valve system. The second section deals with the Wetherill-Corliss engine, made in girder and tangye types and tandem, cross compound and simple forms. The third section deals with the high speed engines made by the Houston, Stanwood & Gamble Company. Various types are illustrated, and tables of sizes are given. The fourth section describes the Crescent safety, vertical, self-contained, side crank and center crank engines, for general power purposes and electric lighting. The last section is a boiler catalogue of Gem City boilers. Return tubular, locomotive type, portable, return tubular portable, internal furnace (Scotch) and vertical boilers, and boilers mounted on wheels are shown, and tanks, feed pumps, feed water heaters and other accessories for complete power plants.

Motors and Generators.—Sterling Electric Motor Company, Dayton, Ohio. Bulletin No. 21. Describes small direct current motors and generators, going into considerable detail with regard to their parts. The motors are made in from 1-12 to 10 hp. sizes, and the generators in sizes of from 250 to 8000 watts capacity.

Grinders.—The Heald Machine Company, Worcester, Mass. Catalogue. Size, 6 x 9 in.; pages, 24. Contains illustrated descriptions of the Heald cylinder grinder and the Heald ring and surface grinder. The former was described in *The Iron Age*, August 3, 1905, and the latter May 31, 1906. Style No. 60 of the cylinder grinder is arranged for belt drive, and style No. 61 for motor drive. Of the ring and surface grinders the following styles are made: No. 200, a hand feed machine; No. 210, an automatic feed machine; No. 215, an automatic feed machine with an automatic micrometer feed chuck; No. 220, a hand feed machine with motor drive complete; No. 230, an automatic feed machine with motor drive complete, and No. 235, an automatic feed machine with automatic micrometer feed and motor drive complete.

Electric Hoists.—Yale & Towne Mfg. Company, 9 Murray street, New York City. Catalogue. Size, 6 x 9 in.; pages, 24. Contains illustrations and descriptions of portable electric hoists adapted to be suspended from stationary points, or from the load hooks of cranes or trolleys. Some special constructions referred to include a single point suspension where with a swiveling hook is used permitting a drag lift at an angle of 45 degrees, so that the hoist may cover a large floor area. It is shown by a diagram that all tensile strains are taken on wrought metal only, and all compressive strains on cast metal only. Turntable collector rings permit the hoist to swivel continuously in one direction without twisting up the current leads, and a solenoid brake attachment allows the controller to be placed at different points. A number of testimonial letters are incorporated. An application of the hoist to an electric trolley was described in *The Iron Age* May 31, 1906.

Contractors' Machinery.—Western Wheeled Scraper Company, Aurora, Ill. 1906 catalogue. Size, 6 $\frac{1}{2}$ x 10 in.; pages, 100. The products of this company are wheeled scrapers, drag scrapers, elevating graders, ditchers and wagon loaders, railroad and township plows, all steel reversible graders, rock and ore crushers, elevators and screens, dump cars, ore cars, stone cars, dump carts, dump wagons, street sweepers and garbage carts. Extensive description of all of these products are given in the catalogue, with many illustrations of the machines by themselves and in operation. A feature that enhances the value of the catalogue is the large amount of space given to instructive information and useful knowledge derived from past experience in the various lines of work touched upon. The text is very complete. One of the newest products described in the catalogue is a 12-yard double truck, side dump car, arranged either for hand dumping or with an air dumping device.

Pneumatic Hammers.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 2006. Refers to the Imperial pneumatic hammers. A variety of chipping and riveting hammers are illustrated, and a table is given of sizes, with the work they are best suited for. Lists of parts are appended.

Planing Mill Exhausters.—Green Fuel Economizer Company, Matteawan, N. Y. Booklet. Describes a new type of fan or exhauster for handling shavings, bark, wool, hair, sawdust and other finely divided substances. A novel feature of the new exhauster is the fan or blast wheel, which instead of having floats or paddles mounted on spokes, consists of a solid sheet iron cone, with floats mounted on its convex side. There are no corners or crevices in which fibrous materials can catch or clog, and the cone also serves to divert the entering column of air and missiles toward the discharge. Greater durability and freedom from clogging and lower consumption of power are claimed for the new construction.

WILLIAM G. SMITH, for 28 years superintendent of the mills of Spang, Chalfant & Co., Incorporated, at Etna, Pa., died last week from pneumonia.

Rapid Growth of the Trademark System.

WASHINGTON, D. C., August 11, 1906.—The Trademark Division of the Patent Office has compiled some figures which constitute an astonishing record for the new law which went into force a little more than a year ago and which for the first time in the history of trademark legislation provided adequate protection for marks employed in interstate commerce. Stimulus has also been given to federal registration by the Currier act, passed by Congress last May, which went into force on July 1. The present law, known as the Bonyng act, became effective April 1, 1905. In less than 16 months 21,076 applications have been received, of which it is believed that nearly 95 per cent. will be registered. This is at the rate of about 1300 applications per month. During the 24 years, from 1881 to the time when the Bonyng act took effect, only 60,000 applications were received, or approximately 2500 per annum. Of this total 36,166 were allowed registration, or about 60 per cent.

Record Under Original Act.

From the passage of the original trademark act of 1870, to its repeal by the act of 1881, approximately 12,000 applications were filed in the Patent Office, of which about 8000 were allowed registration, or an average of little more than 1000 applications and 700 registrations per annum. In view of the high percentage of registrations to applications under the new law, it appears that during the past 16 months the number of trademarks registered per month has nearly equaled the number registered per annum under the act of 1881 and has nearly doubled each month the annual registration under the original statute of 1870.

Two important causes have contributed to the enormous growth in the trademark business of the Patent Office during the past 16 months: 1, The fact that the Bonyng act provided for the registration of trademarks used in interstate commerce, which were not protected under the act of 1881; and 2, The new law has been construed to require the reregistration of old marks in order to protect their use in interstate commerce under federal jurisdiction. In speaking of the enormous strides that have been made in the trademark business of the office under the Bonyng act, E. L. Chapman, chief of the Trademark Division, said to the correspondent of *The Iron Age*:

The prediction which I made a year ago, that the close of the fiscal year would witness the filing of no less than 20,000 marks under the new law, has been fully verified by our figures. Of course, the changes in the law are to be credited with the greater part of this increase, but, as I suggested a year ago, there are other reasons for the growth of the trademark system. Manufacturers and dealers have learned the value of a distinctive, fully protected trademark, and they are more ready to-day to spend money to secure protection and defend their marks against infringement than ever before. The extension of commerce, both foreign and domestic, and the distribution of the manufacturers' goods far beyond the confines of the State in which they are produced have greatly increased the value of a trademark, and the litigation that has arisen as a result of the introduction of trademarked goods into new territory has enabled the courts to construe the statute and point out the way to the most complete protection.

I have been much impressed with the growing tendency toward the adoption of a better class of trademarks, and my prediction of a year ago that under the new statute the ratio of registrations to applications would be greater than under previous acts has been fully verified, showing that manufacturers are devoting their best efforts to selecting distinctive, original devices for the identification of their wares.

The feature of the Currier act, which went into force July 1, providing for the classification of trademarks and for the protection of an entire class by a single registration, was expected to reduce the current number of applications, but although the law has now been in force less than a month the Patent Office officials are confident that an actual increase will result. This grows out of the fact that thousands of manufacturers making a considerable variety of goods, who were prevented from registering their trademarks under the old law because of the prohibitory cost, are now applying for protection in large numbers. In some cases the expense to a single manufacturer under the old law would have amounted to sev-

eral thousand dollars, while under the new statute full protection can be secured by an outlay of \$200 or \$300. Where all the goods produced by a manufacturer are embraced in a single general classification, one registration will afford full protection.

Erroneous Impressions of Law.

In this connection the trademark officials have discovered that considerable misapprehension prevails as to the conditions precedent to the vesting of the property right in a trademark. Manufacturers have filed applications in which they declare their intention of using certain marks upon goods they "propose to manufacture," while others have advised the office that they intend to "add certain lines" to the goods heretofore manufactured. The fundamental principle of the trademark law is that protection shall be afforded only to trademarks which have actually been used upon the goods for which protection is desired, and it is necessary in all cases that the applicant shall state that the marks have been employed on the goods in question; otherwise the registration is void. To comply with the law, however, it is only necessary for the trademark owner to place it on a single consignment of goods shipped from one State to another, after which the work is eligible to registry under the federal law.

W. L. C.

In the New York Subway, to overcome, if possible, the evil effects of the fine metallic dust given off by the grinding of the brake shoes and wheels, as well as the heat engendered by this action, it has been proposed to make a trial of the "regenerative control" system, which has been used with considerable success abroad. There is a great reduction in wear upon wheel tires and brake shoes, besides which there is a small but appreciable economy due to the return into the system of a portion of the energy which has been spent in bringing the train up to the speed at which braking becomes necessary. By this system the motors become generators temporarily, and the current generated is passed into the line, where it operates to reduce the amount drawn from the main power station. The most conspicuous example of the employment of this system is on the well-known Valtellina Railway, in Italy, where it is pronounced to be an unqualified success. It has also been working for some time, and on quite an extended scale, in Birmingham, England.

A three-hinged arch of concrete has been built near Halden, Westphalia, forming the center span of a highway bridge having a 61-ft. concrete span at each end. It has a clear span of 82 ft., a rise of 12.9 ft. and a thickness of 20 in. at both crown and abutments. The concrete used for the arch consisted of a mixture of one part of Portland cement to four of sand and six of broken stone. The hinges were of finer structure, the mixture being one part of cement to two each of sand and stone, and were formed by running a very dry mixture into wooden molds with the curved surfaces formed of plaster of Paris. Lead plates about $\frac{1}{16}$ in. thick were placed between the bearing surfaces and protected on each side by very thin sheets of brass. The hinges are said to have given satisfaction.

The specific heat of superheated steam, according to recent investigations, increases with increase in pressure, and decreases with increase in temperature. It has been shown by experiment that for steam at a temperature of 401 degrees F., the specific heat is 0.58 at a pressure of 63.5 pounds per square inch, and 0.62 at 100 pounds pressure. Similarly, for steam at a pressure of 100 pounds per square inch, the specific heat at 534 degrees F. falls to 0.568, as compared with 0.62 at 401 degrees. This upsets the old theory that the specific heat of superheated steam was a constant, and of a value of 0.4805 under all conditions of temperature and pressure. Much recent experimenting has been done to ascertain the exact law by which the value varies, and exceedingly discordant results have been obtained by the different workers.

The Machinery Trade.

NEW YORK, AUGUST 15, 1906.

Although there was plenty of good steady buying during the week and a number of propositions of minor importance were closed out, none of the big lists that the trade, and especially the machine tool men, have been watching were arranged for. No orders were placed in the New York market by the railroads for any part of the various large lists now before the trade, and machinery men are at a loss to know just what advantage the railroad men see in a delay at this time. They call attention to the fact that manufacturers are advancing prices in some lines, and they declare that there is no possibility of trade slackening up to any noticeable extent this summer, so that if the railroad purchasing agents are waiting with an idea of getting better delivery terms before closing out their orders, it is said they will meet with no success. There was enough machinery bought during the week to prevent any one from complaining of bad business, and the general indications are that things will continue so during the summer. There are a number of new propositions before the trade just now, but none of them are very large, although most machinery houses have more business than they can handle comfortably.

The fact that the Pennsylvania Railroad has about decided to make use of steel cars for its future passenger equipment is an important indication of the trend of mind among railroad men favoring such cars. If, as has been announced, the railroad will have all its future passenger cars made of steel it will result in almost immediate benefit to the machinery trade, as the equipment of a number of steel car plants in this country and Canada during the last year or so has demonstrated that the innovation is one that will call for a large amount of machinery equipment. The steel car plants already built have been the source of heavy demands on the machinery trade, and it is apparent that there will be a great deal of business in that line during the next few months. That the steel car industry is already growing to large proportions has been shown by the recent demands from Canada for equipment in that line. The car builders of that country were among the first to realize the benefit that would accrue from steel cars, and consequently there is a strong rivalry now going on there between the leading interests to capture the trade. A company that builds freight cars in Pennsylvania recently began the erection of a steel car plant, and it has been said in the trade that there have been inquiries from the leading parlor car building interests, with a view to ascertaining the prices of various machines to be used in the manufacture of such cars. From all sides come reports that railroad officials are looking into the comparative value of steel cars, and it is more than probable that before long the trade will be called upon to bid on large lists of requirements for steel car plants. Some of the railroads in planning for new buildings have taken into consideration the probability of the steel cars becoming the standard make, and have made at least some provision for repairing such cars in laying out new shops.

New Railroad Shops.

Work has been begun on new shops at Fitzgerald, Ga., which are being built by the Atlanta, Birmingham & Atlantic Railroad Company. The company has about 200 acres of ground at Fitzgerald and preparations are being made for an extensive system of railroad shops, which will include a machine shop, 75 x 300 ft. in size, in which will be installed an 85-ton electric traveling crane; a blacksmith shop, 75 x 300 ft. in size and 20 ft. high, to contain a 10-ton crane, and a roundhouse, 80 x 350 ft., in which will be installed 28 tracks. There will be a coach shop, 80 x 300 ft., and the power house, which will be 50 x 100 ft., will contain 12 boilers. There will also be a planing mill and wood-working machinery department, contained in a building 75 x 150 ft., and a paint shop, 75 x 280 ft., as well as a pattern house, 50 x 180 ft. A storehouse, 75 x 150 ft., two stories in height; foundry, 50 x 150 ft.; paint storehouse, 50 x 150 ft.; an oil house, 50 x 125 ft., and a freight car shop, 100 x 400 ft. An elaborate coal handling system has been planned, and the total requirements for the plant will amount to about \$300,000, it is stated. Some of the machinery has been purchased and is now being installed, and several of the proposed buildings are well under way.

The Kansas City Railway Company has plans completed for a new system of shops to be established at Pittsburg, Kan., which will include a machine shop, 152 x 360 ft., to be of brick construction, with a balcony for light machines and 15 erecting pits. The company will also build a roundhouse, with 15 stalls and a 75 x 80 ft. turntable. There will be a power house, 99 x 101 ft. long, and a 250-ton locomotive coaling station constructed of wood, with steel underframing and equipped with an electric hoist. There will be

a sand house, also of wood, with a capacity of 500 yd. of sand, and an oil house, constructed of concrete, with a capacity for five kinds of oil in 8000-gal. tanks. The requirements include one 120-ton electric crane, with a 10-ton auxiliary hoist, one 30-ton crane and one 10-ton crane. F. Mertsheimer, superintendent of machinery for the road, who has offices at Pittsburg, Kan., is making all arrangements for the machinery equipment.

The American Locomotive Company has completed plans for its new plant at Richmond, Va., to be utilized for manufacturing steam shovels. The plant will cost in the neighborhood of \$500,000, and it will be 172 ft. wide and 450 ft. long, in three bays. The two outside bays will be 49 ft. wide and 32 ft. high, running the full length of the building, and the center bay will be 74 ft. wide and 48 ft. high. The center bay will be used for assembling the steam shovels and building the locomotive tanks and trucks, while the outside bays are to be used in turning out the parts. There will be two cranes of 10 tons' capacity each, with a 66-ft. span, and 30 ft. high. The company has placed orders for a large amount of the machinery and some of it is being delivered, although it is said in the trade that there are still some orders to be placed. Later on, the company expects to build an erecting shop in connection with its Richmond plant, as well as a new power house, with a capacity of about 3000 hp. Plans are also under way for a large producer gas plant, and considerable new coal handling machinery will be added.

The Shenandoah Steel Wire Company has been incorporated, with a capital stock of \$1,500,000, and an extensive plant will be erected on a tract of land in the suburb of West Seneca, adjacent to the plant of the Lackawanna Steel Company and near the new plants of the Buffalo & Susquehanna Iron Company and the New York State Steel Company at Buffalo, N. Y. The directors of the new company are: Arthur S. Kittle, John F. Carlton, New York; William F. Holt, Palisade, N. J.; William MacBain, Closter, N. J., and Robert Tomlins, Brooklyn. Moses Taylor of New York is also interested in the concern. The new company is closely identified with the Iroquois Machine Company, 150 Nassau street, New York, and it will manufacture steel wire, with machines of a new type, designed for drawing the wire by a continuous process. Those interested have had their machines running in four different mills in this country, with good success.

The Orford Copper Company has a large amount of machinery to buy for a big addition it is making to its plant at Constable Hook, Bayonne, N. J., and orders are now being placed for equipment. The details are being arranged at the company's plant there, and it is said in the trade that the requirements call for a large expenditure of money. Contracts were placed during the week for part of the power equipment, and the Mesta Machine Company, through its New York office, 149 Broadway, received orders for 400 horizontal cross compound Corliss engines, direct connected to a Crocker-Wheeler 300-kw. generator.

The plant of the Prospect Dye Works at Reading, Pa., which was recently destroyed by fire, will be replaced by a factory, to be erected in a new location near Reading. The plans include four buildings, each 60 x 150 ft., and an electric plant of probably 200 hp.

Business Changes.

The firm of Shirley & Grant, Reno, Nev., has been appointed the sole representative for that State of the Traylor Engineering Company, 114 Liberty street, New York.

Chicago Machinery Market.

CHICAGO, ILL., August 14, 1906.

Western roads continue to delay closing for their equipment requirements for the last half of the year, and in some instances through 1907, notwithstanding the fact that negotiations have been on during the past two or three months. While the Illinois Central Railroad, whose complete list appears below, is carrying on experiments and is carefully examining into the merits of tools to be purchased, other roads are evidently holding off on account of the deferred deliveries of practically all lines, believing that somewhat better prices might be obtained later in the year in the event of a relaxation of the present pressure on manufacturers. Specifications covering a small number of tools were issued this week by the Chicago, Burlington & Quincy.

Mention has been made in these columns from time to time relative to the machinery requirements of the Illinois Central Railroad Company, and we are now able to give the complete list specified. The greater portion of this equipment will be installed in a new erecting shop which is being built at the Burnside shops. Other items will take the place of old equipment, the latter being relegated to subordinate shops along the line, and a few of the new tools will also find their way to other shops. The list, which is an extensive

one, follows: Three Putnam Machine Company's No. 2 car wheel boring machines, five-jaw chuck table, for wheels up to 48 in. in diameter, power hub facing attachment and power crane; five Bausch Machine Company's 42-in. vertical boring mills, two heads on cross rail, Hendy-Norton quick change gear boxes, weight about 16,200 lb., with three-jawed universal and independent chuck tables; two Schaeffer 42-in. 200-ton wheel presses, with base plate; one Putnam Machine Company's No. 4 double axle lathe, opening in head 16 in., 12½-ft. bed, taking 8¼ ft. between centers, weight about 17,000 lb., with steel crane; one Gray 36 x 36 in. by 12 ft. planer, two heads on cross rail; one Gray 30 x 30 in. by 8 ft. planer, one head on cross rail, weight 10,300 lb.; one Morse & Dexter No. 4 valve reseating machine; one 36-in. planer; one sander; one double head shaper; one band saw, with resaw; two 20-in. swing cut-off saws, with 10-ft. table; one No. 3½ tenoner; two rip saws; one No. 13 molder; two timber dressers, 12 x 30 inch; one Hill & Clarke universal radial drill press, 6-ft. arm; one spindle borer; one mortiser and relisher; one 3-lb. gainer; one hollow chisel mortiser; two saw filers; one rotary 28-in. valve seat planer; one Niles 42-in. steel tired car wheel lathe, complete with calipering attachment, weight 3500 lb.; two Acme 2-in. double bolt cutters, with 14 sets of cap dies, United States standard threads, complete with pump, countershafting, wrenches, &c.; one Niles 22 in. by 8 ft. lathe, with taper attachment, back gear, quick change gears, compound rest, 20-in. swings; one two-spindle drill press, swing 14½ in., distance from column to center of spindle being 7¼ in., traverse of spindle 3½ in., vertical adjustment of head 7 in., hole for No. 1 Morse taper, with standard slot for drifts, steel rack, graduated quills; one Niles new pattern 90-in. driving chucking lathe, complete with Teas' patent drivers to face plate with double quartering attachment, weight 85,000 lb.; one Niles 90-in. driving wheel hydraulic press, having 300 tons capacity, complete with double pumps, copper lined cylinder, patented stop device and all the latest improvements, weight 23,700 lb.; one 26-in. crank shaping machine, back geared, quick return, vise, etc., complete; two 300-hp. water tube boilers; Green automatic stokers for three Cahall and six Erie City boilers, all 300 hp.; one 75-ton capacity wrecker; two emery wheel tool grinders, No. 5 Northampton wheel, 24 x 3 in.; one 1120-ft. air compressor; one double punch and shear; one No. 3 radial wall drill, on 15-ft. arm, to be arranged for motor drive; three 130-lb. Justice hammers; one Acme bolt header, with three sets of dies; one angle shear, 6 x 6 x ½ in., with motor; one driving wheel jib crane; one 175-hp. stationary engine, 15¼ x 27 in. cylinder.

The Steidle Turret Machine Company, Madison, Wis., was organized on August 1, under the laws of the State of Wisconsin, with a capital stock of \$60,000, for the purpose of manufacturing an improved full swing lathe. The lathe is designed for use in the rapid and accurate finishing of cast iron, steel, forgings and other machine parts that are manufactured in quantities, and will have the semiautomatic power moving feature. The plant of the company will be located near the eastern limits of Madison, with trackage facilities on the Chicago & Northwestern Railroad. Lists have been issued for about 18 machine tools for the equipment of the plant, and orders will be placed at an early date. The officers of the company are: G. A. Steinle, president; Wm. R. Bagley, vice-president; J. A. Steinle, treasurer, and A. M. Bagley, secretary. G. A. Steinle has had many years' experience in the turret lathe business, and was for a number of years and until recently a stockholder in the Gisholt Machine Company of Madison. While with the latter concern he spent considerable time in Europe and this country as mechanical expert, devoting much time to the designing of special tool equipments.

A fire which entailed a loss of nearly \$150,000 and wiped out half a block of "Machinery Row" on South Clinton street, Chicago, occurred early in the morning of Friday, August 10. The fire originated in the plant of the National Stamping & Electric Company, manufacturer and jobber of electrical equipment and special machinery, and spread to the plants and showrooms of the F. A. Delano Company, pulley manufacturer; C. F. Hommerdieu, dealer in platers' and polishers' supplies, and the Barnes & Erb Company, manufacturer of laundry machinery. On account of the collapse of one building and the main floor of another there will be little equipment salvage. The F. A. Delano Company has established temporary headquarters at 62-64 South Canal street, while C. F. L. Hommerdieu is located at No. 44.

The Board of Public Works of the city of Milwaukee has awarded the contract for a new 20,000,000-gal. pump for the North Point Water Works to the Wisconsin Engine Company of Corliss, Wis., for \$66,950. The bid of the company was nearly \$20,000 lower than the other bids submitted, which were as follows: Allis-Chalmers Company, \$84,700; Filer & Stowell Company, \$97,000; Wm. Tod of Youngstown, Ohio, \$84,200; Holley Mfg. Company, \$93,500. An unsuccessful effort was made by the labor unions to prevent the awarding of the contract unless the company agreed to employ union labor. The contract calls for the completion of the work in September, 1907.

The firm name of Wm. Ganschow, 12 South Clinton street, Chicago, manufacturer of cut gears, has been changed

to the Wm. Ganschow Company, which has incorporated, and the following officers have been elected: Wm. Ganschow, president; C. Ganschow, vice-president; E. J. Ganschow, secretary and treasurer. During the past six weeks the capacity of the company's shop has been materially increased by the installation of two Gleason planers, 24 and 36 in., respectively, and one 60-in. Brown & Sharpe automatic spur cutter. The company reports an exceedingly heavy demand for gears of all kinds.

The Kankakee Mfg. Company, Kankakee, Ill., will at once commence the construction of a foundry and machine shop, in which will be installed a modern plant suitable for the manufacture of steam and hot water heaters. The company will purchase a molding machine, crane, conveyors, drill presses, core oven truck, &c.

The city of Fremont, Neb., will build a new city electric light plant and will receive bids on equipment as follows: Two compound condensing engines of the horizontal type, having an aggregate horsepower of 565; two three-phase 60-cycle 2300-volt generators, with an aggregate capacity of 375 kw.; boilers aggregating 800 hp. and other electrical equipment.

The Holdredge Lighting Company, Holdredge, Neb., is building a new electric light plant and is in the market for boilers and steam fittings. Purchases have already been made of Ball engines and Westinghouse generators.

The city of Galveston, Texas, is in the market for four 200-hp. water tube boilers. Bids will be received until August 30 by John D. Kelly, city secretary.

The Vermont Marble Company, Chicago, is erecting a new factory and boiler house and will install machinery for a finishing plant. Purchases of machinery will be made through the home office of the company, which is located at Proctor, Vt.

Philadelphia Machinery Market.

PHILADELPHIA, PA., August 14, 1906.

Notwithstanding the season a good volume of business continues to be transacted by local manufacturers and machinery merchants. Sales have been fairly well divided, and have been largely of individual tools, covering mostly the smaller and medium sizes. Inquiries continue in good number, but a good share of these must be attributed to shopping around in the hope of getting better deliveries. Price, as a rule, is not the most important feature of transactions to-day, as many sales are governed almost entirely by the delivery which can be given. Some of the smaller lists before the trade have been practically closed during the week. The order for several small tools, grinders and miscellaneous equipment for the Northeast Manual Training School, mention of which has previously been made in these columns, was closed, one of the local merchants capturing the bulk of the business. Several additional orders for small tools on the Pennsylvania Railroad list have been placed, while specifications for a number of tools for the Erie Railroad are now before the trade. There is also a good lot of Southern business under consideration from both railroads and individual concerns, but the receipt of specifications has not yet been reported by the trade. On the whole, the outlook for business during the coming fall, considering what is still unclosed and what is in sight, is considered to be exceptionally good.

The export demand for machine tools of the standard types remains inactive, but that for special tools shows some improvement. There has also been a better demand for power transmission equipment, manufacturers of shaft hangers and pulleys reporting quite a material increase in sales. This condition is no doubt due to the more determined efforts of makers of the latter lines to get foreign business, while the tool makers, being practically unable to satisfy the home demand, are not particularly catering to the foreign trade at the time.

But little improvement is apparent in the demand for boilers and engines. The vacation season seems to have affected this branch of the trade to a considerable extent, and manufacturers and dealers complain of the inability to close pending business. There are some good propositions for medium and higher powers before the trade, which it is hoped will develop into business at an early date. Scattering sales of the lower power equipment are to be noted.

Fair business is reported by second-hand machinery merchants, particularly for tools of the medium and larger sizes, which in some instances are hard to get for prompt shipment. Stocks of the smaller tools, however, are reported to be in good shape and prompt delivery can be had.

Iron and steel foundries continue busy and practically all are working at their full capacity, although the tonnage output has in instances been somewhat restricted, owing to the heated term. There is but little change in de-

liveries, the volume of new business offered making it impossible to catch up on orders to any material extent. Steel castings are the most difficult to obtain promptly, although orders for some classes of gray iron castings cannot be taken except for extended delivery.

The Pennsylvania Auto-Motor Company of this city, which has a temporary plant at Rosemont, Pa., will erect a new plant for the building of touring cars and motor trucks at Bryn Mawr, Pa. Plans are now being prepared for the building and work is expected to be started at an early date. The new plant will be used for the assembling and construction of the cars and trucks, and while the company will eventually be in the market for a number of the lighter machine tools it has not decided as yet just what the equipment will consist of. Charles J. McIlvain, Jr., is president, Phineas Prouty vice-president and Charles L. Stovell secretary and treasurer of the company, which has its office at 1518-1519 Land Title Building, Philadelphia.

The United States Indian School, Carlisle, Pa., is asking for proposals for a number of supplies, among which are included electric motors, a stone crusher, woodworking machinery, cement, wire fencing and a number of minor tools, specifications covering which may be had by application to Major Wm. A. Mercer, superintendent, Carlisle, Pa. Bids will be received until August 31.

The Standard Pressed Steel Company has established a new foreign agency for the sale of the American Pioneer pressed steel shaft hanger in Switzerland with J. Lambercier & Cie., Geneva, and has made an extensive shipment to that firm to cover immediate deliveries to the trade. Deliveries of several hundred hangers each have also been made to parties in Germany and in Stockholm, Sweden. Both the foreign and domestic demand for these hangers has been exceptionally good. Domestic deliveries include one lot of 480 hangers of various sizes to New England, while 125 of the largest size, $3\frac{1}{2}$ x 24 in. hangers, have been furnished the Standard Steel Works, Burnham, Pa.

Thos. H. Dallett & Co., Incorporated, are busy in all departments. The demand for pneumatic riveting and chipping hammers is good, particularly for the types used in connection with their line of stone working tools. A number of electric portable drills have been also sold, and pneumatic stone working machines have been exported to Scotland, Norway and Italy, while a large number of domestic customers have also been furnished with these tools.

The American Pulley Company notes a material increase of business for this season of the year, from both foreign and domestic sources. Every department of the plant is being operated at its full capacity, and orders on hand are sufficient to keep it so occupied for a long time. Among some of the recent export shipments by this company was one of nearly 800 wrought steel pulleys to London, England, and a like number to New Zealand. A large shipment has also been made to Spain. The domestic business includes orders from all sections of the country, carload shipments having been made to several Southern and Middle Western points, as well as to the Pacific Coast.

Deinelt & Eisenhardt, Incorporated, continue busy in every department. Inquiries and orders are being received in good number, and sufficient work is on the books to keep them fully occupied for a long time. A large oil cloth printing machine has been furnished to a large linoleum concern in Newark, N. J., and several large machines of the same type are building for the George W. Beabon Company of this city. A number of pipe expanding and flanging machines have been furnished the Lovekin Pipe Expanding & Flanging Machine Company, one taking in pipe up to 16 in. in diameter for shipment to Chicago, while a large one was shipped to the Norfolk Navy Yard and another to parties in Boston, Mass. Heavy hydraulic jacks, up to 40 tons capacity, have also been furnished a number of railroads, while their electrical department is exceedingly busy on a large variety of Monarch motors.

The Standard Engineering Corporation, Land Title Building, Philadelphia, representative for the Northern Engineering Works, Detroit, Mich., recently received an order from the Pennsylvania Railroad Company for three electric traveling cranes, one of 5 tons capacity, 54 ft. 11 in. span, and two of $12\frac{1}{2}$ tons capacity, 54 ft. 3 in. span, to be installed in the shops at Altoona.

In a small plant in central New York using vertical shaft outward flow turbines operating under a head of 265 ft. of water five-eighths of the weight of the revolving parts is carried by the upward reaction of the water. The remainder is carried by a flat step bearing, through which 4 gal. of oil per minute are circulated under a head of 30 ft. The wheels have been in operation some two years and still show the tool marks. The wheels showed an efficiency on test of 76 per cent. at full gate opening. They are operated at about 70 per cent. of their full rated capacity.

New England Machinery Market.

WORCESTER, MASS., August 14, 1906.

The impression prevails among machine tool dealers that the recent advance of 5 per cent. in the price of milling machines will be followed by a similar advance through the entire line of machine tools. The summer has been a revelation as to the condition of the market, for while August is beginning upon its last fortnight the warm weather has not yet materially affected business, and in many instances there has been no effect at all. On the other hand, with certain tools, the demand has increased, if anything. The auction sale of the Shaw Machine Company's machine tools has had an important effect, dealers and manufacturers having called the attention of their customers to the high prices which prevailed under the usually adverse conditions of a forced sale, and there is no doubt that buyers have been impelled to cease deferring the placing of their orders because of the lesson taught at this sale. Every other element which enters into the outlook of business serves to accentuate the impression that it will be a long time before the machine tool trade sees a turn for the worse. Deliveries are getting more and more backward with most classes of tools. Quotations for deliveries in 1908 are heard in certain sizes and makes of milling machines, and 1907 is glibly spoken of in machinery circles as being a common enough date of delivery. The need of new equipment is being felt in many instances where manufacturers have delayed placing orders, in the hope of a turn in the market, because deliveries were too far ahead and prices too high, though the element of prices is hardly a conspicuous one, as compared to deliveries. These people must order equipment in the near future or be at a serious disadvantage in taking care of their business. The second hand tool market is proportionately as high as that for new tools, for a scarcity exists. Hill, Clarke & Co.'s sale of the tools of the Goddard Machine Company, Holyoke, indicates the strong demand for machines which have seen good service, more than one-half of the equipment having been sold on the premises, and this in spite of the fact that prices were higher than the advertised list sent out by the company before the machinery house bought the equipment.

Considering conditions and prospects, the dealers feel that another general advance in the prices of machine tools would be only natural on the part of manufacturers. Some machine tool builders are getting better prices than those which resulted from the advances following the last two meetings of the National Machine Tool Builders' Association. As already announced, milling machines have advanced again, and it was natural that they should be the first to do so, as the demand for this class of machinery is probably greatest. It would be perfectly logical if other machine tools went up correspondingly. The annual meeting of the National Machine Tool Builders' Association comes in October at New York, and the matter will undoubtedly be brought up for discussion. Not all dealers are hoping for an advance. It will be remembered that in May opposition to an increase was manifested, but the manufacturers decided that conditions warranted higher prices.

The manufacturers of woodworking machinery have followed the lead of the machine tool builders in advancing prices, the ratio of increase being, generally speaking, about the same. It is quite probable that other advances will be made in the near future. The woodworking machinery people are without the advantage of organization, and consequently their prices must be regulated as individuals and not through the action of an association. No uniform increase can, therefore, be made, but taking the trade as a whole the result is about the same as has been demonstrated during the past 10 months or so.

The New York, New Haven & Hartford Railroad Company has not yet awarded the contracts for the machinery which will equip the new locomotive repair shops at Norwood, Mass. Bids have been in for weeks. New Haven, the headquarters of the company, has been frequented by representatives of manufacturers and dealers during the past 10 days, all engaged in the effort to get a share of the large amount of business which is to be placed. Most dealers fear that the entire machine tool equipment will be awarded in one contract to an individual firm of dealers which will apportion such tools as it does not carry among those dealers who do.

The American Locomotive Company is to make additions to its works at Manchester, N. H., to take care of the growth of the steam fire engine business. A new building will be 66 x 77 ft., one story, with center bay 25 ft. in

width, which will be served by a 5-ton electric traveling crane. It had been supposed that the manufacture of the Amoskeag fire engine would be abandoned at Manchester, which would have meant a serious blow to the Manchester works of the company. The rights to manufacture this engine have been sold to the International Power Company, and hereafter the engine will be manufactured for this company under contract with the Locomotive Company. The new space will be used as an assembling room, which will relieve other parts of the works for manufacturing. A considerable amount of new machinery has recently been purchased.

Charles E. Capon, Eastport, Maine, is negotiating for the equipment of a new electric lighting and power plant for that place, his requirements comprising boilers, engines, dynamos, &c., for a lighting plant with a capacity of 5000 lights. The necessary rights have been obtained for the lighting service, which will be in competition to an existing company.

The National Pipe Bending Company, New Haven, Conn., manufacturer of feed water heaters and coils and bends, is to erect an addition to its plant, to be three stories, 60 x 90 ft., with a wing 40 x 60 ft. The new space will be devoted to manufacturing, the growth of the business requiring these additional facilities.

The business of the Ball Mfg. Company, Stamford, Conn., manufacturer of gasoline engines and machine tools, has been purchased by the Lozier Motor Company, New York. Charles P. Ball, who has been the head of the business, will remain as superintendent of the works. The manufacturing facilities of the shops will be increased. The manufacture of machine tools, including the company's crank shaft grinder, will be discontinued.

C. W. Walker has been made manager of the New England branch of the Blaisdell Machinery Company, Bradford, Pa., manufacturer of compressors. His office will be in the Machinery Exchange, 10 Oliver street, Boston.

While the identity of the members of the syndicate which has purchased the James Brown Machine Company plant and business at Pawtucket, R. I., has not been revealed, it is announced that the name of the company will not be changed and the corporation will remain as it is under the laws of Rhode Island. The present authorized capital stock is \$300,000, and it is stated that the amount may be increased a little later. The new owners, it is stated, will manufacture textile machinery.

The A. M. Lunt Burner Company, 610 Columbia road, Dorchester, Mass., has been incorporated in Massachusetts to manufacture carbon oil and alcohol engines and burners. The authorized capital stock is \$200,000, and the officers are: President, I. C. Ogden; treasurer, A. M. Lunt, and clerk, E. P. Aechtler. The company states that for the present it will confine itself to the automobile and power boat trade, but intends later to manufacture oil ranges and furnaces.

The Connecticut Railway & Lighting Company is to erect a new repair shop at Waterbury, Conn. The building will be one story, 100 x 200 ft., and of brick and steel construction. The company will build an addition to its power plant at Bridgeport, to provide space for a new 1200-hp. engine.

It is announced in Providence that a new industrial building, to be devoted entirely to the manufacture of jewelry, will be erected in that city by Helen M. Usbeck, New York, and William H. Herrick, trustee of the Estate of William H. Pearsall, New York. The building will be seven stories in height and 50 x 150 ft. on the ground. An electric power plant will be installed in the building for the purpose of providing electric power for manufacturing purposes as well as for lighting.

The C. D. Potter Company, 11-13 Garden street, Stamford, Conn., has been incorporated in Connecticut to manufacture piano hardware. Manufacturing has already begun. The company is capitalized for \$15,000, the incorporators being C. Dana Potter and Arthur T. Blaber, Sound Beach, Conn., and Fred G. Blaber, Germiston, Transvaal, South Africa.

William Lee, formerly of Otter River, Mass., has leased the Wallace Lord factory, Athol, Mass., and will equip it for the manufacture of cotton rope and clothesline.

The Atlas Mfg. Company, York, Maine, has taken the Hampton shoe shop, Hampton, N. H., and will manufacture a patent folding lunch box. The company is in the market for a pebble machine for pebbling leather board, and a special gluing machine for gluing leather strips $\frac{3}{4}$ in. wide.

The Draper Company, Hopedale, Mass., manufacturer of textile machinery, is replacing the plant at North Newport, N. H., which was recently destroyed by fire. The building will be devoted to getting out lumber and roughing out certain wooden parts, which are used at Hopedale.

The Union Typewriter Company, Bridgeport, Conn., is to build an addition to its works, 40 x 100 ft., to be devoted to the manufacture of typewriter ribbon and carbon paper branch of the business, doubling the capacity of the department.

Government Purchases.

WASHINGTON, D. C., August 14, 1906.

Bids which were received by the Bureau of Yards and Docks for air compressors for the Charleston Navy Yard have been rejected and the contract is readvertised, because of a protest made by the J. L. Seirgard Company, Philadelphia, and the Ingersoll-Rand Company, New York, against the lowest bidder, which was the Laidlaw-Dunn-Gordon Company, Cincinnati, on account of circumstances under which the lowest bid was received. The contract is worth about \$20,000, and new bids will be opened September 1.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, until September 11, for the following machine tools for the Mare Island Navy Yard: One lathe, one band saw machine, one 4600-lb. steam hammer, one blue printing machine, one jump saw and 5-ton derrick and fittings. Applicants for proposals should refer to schedule 79, and blanks will be furnished at the bureau or at the Navy Pay Station, San Francisco.

Proposals will be received in duplicate at the Bureau of Equipment, Navy Department, Washington, on October 3, for a complete coal handling plant for the naval coal depot, California City Point, Cal. Plans and specifications may be obtained from William S. Cowles, chief of the bureau.

Bids were opened July 7 by the Reclamation Service, at Chicago, Ill., for pumping apparatus for the Garden City, Kan., project, as follows:

Item 1. Furnishing 10 centrifugal pumps as per specifications.

Item 2. Additional lump sum for substituting bronze for cast iron impellers.

Item 3. Furnishing 23 centrifugal pumps as per specifications.

Item 4. Additional lump sum for substituting bronze for cast iron impellers.

Item 5. Amount of energy consumed by each motor per foot lift, under estimated maximum lift.

Byron Jackson Machine Works, Oakland, Cal., item 1, \$17,500; 2, \$450; 3, \$38,000; 4, \$1000; 5, 25 ft., 750 watts. J. Edward Ogden Company, 147-149 Cedar street, New York, item 1, \$12,355.75; 2, \$495; 3, \$28,418.22; 4, \$1135.50; 5, motor efficiency, 87.5.

Camden Iron Works, Camden, N. J., item 1, \$14,200; 2, \$240; 3, \$32,250; 4, \$550; 5, 32 ft., 0.35190 watts per foot lift.

Dayton Hydraulic Machinery Company, Dayton, Ohio, item 1, \$16,100; 2, \$640; 3, \$37,000; 4, \$1470; 5, 12 ft., 800 watts.

Henion & Hubbell, 61-69 North Jefferson street, Chicago, item 1, \$14,350; 2, \$400; 3, \$33,000; 4, \$920; 5, 60 per cent. efficiency on pump 88. Item 1, \$13,350; 2, \$400; 3, \$30,700; 4, \$920; 5, 87.5.

D'Olier Engineering Company, 1121 South Eleventh street, Philadelphia, Pa., item 1, \$17,700; 2, \$360; 3, \$38,120; 4, \$828; 5, 26.3 ft., 752 watts.

Henry R. Worthington, 114 Liberty street, New York, item 1, \$15,250; 2, \$1350; 3, \$35,075; 4, \$3105; 5, 31 ft., 750 watts.

Lawrence Machine Company, Lawrence, Mass., item 1, \$14,432; 2, \$950; 3, \$32,825; 4, \$2200; 5, 31 ft., 710 watts.

Platt Iron Works, Dayton, Ohio, item 1, \$16,000; 2, \$550; 3, \$36,000; 4, \$1300; 5, 65 per cent. pump, 86 per cent. motor.

United Iron Works, Oakland, Cal., item 1, \$17,500; 2, \$750; 3, \$40,250; 4, \$1725. Item 1, \$18,500; 2, \$750; 3, \$42,550; 4, \$1725.

Jeanesville Iron Works Company, Jeanesville, Pa., item 1, \$17,063; 2, \$500; 3, \$38,250; 4, \$1200; 5, 28.08 ft., 850 watts.

The Cincinnati branch of the National Metal Trades Association held an outing at Chester Park on August 11 for the benefit of all employees and their families. This is said to have been the first outing of its kind ever given in this country, and was a most successful affair. About 150 prominent manufacturers were present. There were 500 entries in the athletic contests, numbering some of the best athletes from the machine shops in the State. Fireworks were displayed in the evening, some of the set pieces being of especial interest to the craft, among them being Vulcan the blacksmith, while "castings" and "high speed" were humorously reproduced. After the programme of the day had closed the regular quarterly dinner was participated in by the manufacturers.

The Pennsylvania Railroad, which has had an experimental steel passenger coach in service for some time, it is said will hereafter purchase only steel passenger equipment.

Labor Notes.

At Hartford, Conn., the Pratt & Cady Company, the Hartford Foundry Corporation, the Phoenix Iron Works and the Capitol Foundry Company have compromised the recent demand made by the Iron Molders' Union. The molders and coremakers asked for a minimum of \$3 a day, instead of \$2.75, and a general increase of 10 per cent. The foundries named granted the minimum, but declined to make the 10 per cent. increase in all wages. The settlement does not affect the Pratt & Whitney Company strike, in which a different issue was raised.

The employees of the Susquehanna Iron & Steel Company, Columbia, Pa., have refused to strike for an increase of 12½ per cent. in wages. A meeting of the men called for Saturday night, August 4, was attended by from 50 to 60 out of 2000 employees. After considerable discussion, President McArdle of the Amalgamated Association asked the passage of a resolution pledging the men to strike if the proposed demand was not granted. This the employees present refused to do. The proposed increase was from \$4 to \$4.50 for puddling and a corresponding advance for finishing, the same as asked by the Amalgamated Association in the Eastern mills in which the association has a foothold. The Susquehanna Iron & Steel Company's mills are all running full.

The Associated Iron Molders of Scotland have published a "Report of the American Delegation, 1906." Representatives of the union were sent to the United States to confer with the officers of the Iron Molders' Union of North America, with a view to establishing closer relations between the molders' unions in Great Britain, Canada and the United States. It is understood that a working agreement will be formulated under which the unions on both sides of the water will be mutually helpful in case of strikes, at least to the extent of preventing importation of molders to take the places of strikers.

The boiler makers' strike at Chicago is settled and all the men have returned to work excepting in three shops, having signed individual agreements. The machinists' strike at Indianapolis is also settled, and that at Lynn is to all intents and purposes a closed chapter. There has been a heavy accession to the ranks of the National Metal Trades Association since the last annual meeting—in fact, even greater than ever before.

A producer gas plant at the Dalmuir (Scotland) Works of Wm. Beardmore & Co., Limited, supplies power for the entire shipbuilding yard, which covers 90 acres and has a river frontage of more than a mile. There are five Duff producers, each capable of converting 1 ton of coal per hour. For the combustion of each ton of coal there are used about 3 tons of steam and 2¼ tons of air. Before the gas is delivered to the furnaces in the yard and to the engines it is passed through the superheaters, mechanical washers, acid towers and cooling towers, the latter serving also as scrubbers; for the engines it is passed through another scrubber and through cleaning fans. The present plant contains eight Oechelhauser engines rated at from 400 to 2000 hp. Two of these are used for driving air compressors, while the remainder are direct connected to dynamos.

A unique type of electric storage battery locomotive has recently been installed on the Great Northern, Piccadilly & Brompton Railway, a part of the London underground. It is capable of hauling a train weighing 120,000 pounds 9½ miles per hour. The battery compartment, located in the middle, occupies nearly the entire length of the locomotive and contains 80 cells of 21 elements each, the weight of cells being 36 tons. The normal discharge current of 180 amperes may be increased in emergency for short periods to 800 amperes, the flow being handled by a controlling apparatus of the British Thomson-Houston type. The car is 50 ft. 6 in. long and is constructed of steel, with a steel hood over the battery compartment.

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HARDWARE

THE circle of business interests adversely affected by mail order houses is widening. These houses now propose to extend their operations to banking. Chicago advices state that country bankers are greatly disturbed over a recent development which threatens to sap their vitality. They have learned that the rural sections of the Central West have been circularized by mail order houses requesting the opening of deposit accounts, offering to pay as high as 6 per cent. interest and to furnish certificates for such deposits payable on demand. The circulars are not only sent to farmers but also to workmen in towns and villages, thus taking in a very large part of the income producing population. The purpose of the scheme is plainly to increase the sale of merchandise, as the depositor is advised that he can make purchases against his bank account and have the charges deducted from the amount standing to his credit. The plan is now in use by some of the department stores in large cities, and has evidently been found effective in stimulating business. The high interest which is held out as an inducement would hardly be paid if the mail order house was simply adding a banking department; but it is expected to be easily borne out of the profits accruing from the increased sales of goods to those having running accounts. The resentment of country bankers against this invasion of their field of operations is said to be so great that they are actively seeking for some practical method of heading it off. Retailers of merchandise and small manufacturers, who have increasingly felt the withering competition of the mail order houses operating in their territory, will be greatly interested in observing what degree of success will attend the efforts of the bankers. Much rejoicing would be occasioned if the mail order houses in grasping for still greater business advantages should antagonize interests capable of effective opposition and perhaps of damaging retaliation.

A most excellent basis for expecting good business for at least another 12 months is afforded by the Government crop reports issued the past week. These reports show that the general outlook for crops in this country is better than ever before known. It is now expected that the total wheat crop will reach the enormous figures of 772,264,000 bushels, or 24,000,000 bushels greater than the crop of 1901, which was the largest on record. The corn crop is estimated at 2,713,000,000 bushels, or 6,000,000 bushels greater than the crop of 1905, which was the largest on record. The indicated crop of oats is 852,482,000 bushels, which is heavier than any year except 1902, 1904 and 1905. The condition of cotton is well above the 10-year average, and an important contribution to the growing prosperity of the Southern States is thus assured. In these conditions there is found a most promising basis for a continuance of a notable activity in industrial and commercial fields.

A feeling of apprehension has been prevalent in commercial circles that some calamity would befall the crops this year, partly because it is rare that two years in succession show great returns from agriculture, and partly because last winter was exceptionally mild. It now appears that all such fears have been groundless. A country which is so blessed with an abundance of the great agricultural staples is placed in a position almost to defy

reckless financing or commercial imprudence. Over and over have financiers of other countries criticised the United States for extravagance or wild speculation and for crudity in its currency system, but over and over have they been compelled to acknowledge that its natural riches are so great as to offset the evil results that might have followed from any of these causes had they existed in countries not so affluent.

While it would seem that the prosperous conditions which have so long favored us must at some time give way to depression, the indications now are that the period of good times is to be further extended. In the primary markets for Iron and Steel a condition is observed which indicates growing strength and the possibility that prices may rise to higher levels. With the consuming power of the country fortified by the great crops of this year, our manufacturers and merchants can confidently look forward to a season of active trade and sustained values.

Condition of Trade.

The prominent feature of the situation at present is the tonic effect which an already steady and confident market is feeling from the assurance of great crops, with the accompaniment of other conditions which make for the continuance of the existing prosperity. It would indeed appear that the year is to be a record one in the volume of agricultural products, unless later untoward and improbable influences interfere with the realization of the exceedingly hopeful prospect. The wealth which will thus come to the agricultural States will in due course be disseminated throughout the commercial and manufacturing portions of the country, insuring the stimulation of industry and of commercial interests in every department of trade. There are not a few indications of increased enterprise on the part of the railroads and manufacturers generally in making improvements and extensions involving in many cases large expenditure. The market already gives evidence of the influence of this enterprise in the growing volume of business. Merchants, too, in practically all lines are reported to be buying liberally and laying in stocks of merchandise to meet the demands which will come to them during the fall and winter months. The strong tone of the Iron market is also another marked feature of the situation and its effect is felt to a greater or less extent along the whole line of manufactured products into which this material enters. In view of the large number of unexecuted orders on the books of the manufacturers and the difficulties which merchants experience in obtaining goods promptly, there is more than a probability that an increasing number of lines will be scarce, and it is the part of wisdom for merchants to see to it that their requirements are covered without delay. Most of the jobbers have provided liberally for the requirements of the season, but some of them complain that even at this time their stocks are not as full or as completely assorted as they would desire. In the matter of prices, in addition to the firm tone which naturally accompanies these conditions there is little new to note, except that minor advances are frequent, as extreme discounts are withdrawn if higher prices are not formally announced. With these favorable conditions at home the foreign outlook is prom-

ising, with indications that export business will be of very large volume.

Chicago.

Notwithstanding the heavy July buying movement to cover requirements for the fall trade Western jobbers and manufacturers report no appreciable decrease in the number of new orders received from day to day, and the indications already point to a continuation of the present activity well through the year. Fall goods are already going forward in large volume on orders placed during the past 30 days and distributors meet with difficulty in securing shipments from the manufacturers. There has been a marked improvement in the past 10 days in the demand for Stoves and accessories for October and November shipment, and manufacturers are hopeful of disposing of their stocks, which are greater than ever before, in spite of the large number of Stoves carried over by retail merchants from last year. Prices as compared with those ruling in the summer of 1905 are practically unchanged, although there have been sharp advances in raw material, and the accruing profits to the makers will not be nearly as large as during periods of normal trade. In place of a reduction, which has been made on Wire products in former midsummer periods to induce fall buying of Wire products, indications now point toward an early advance, single loop Bale Ties having been marked up 5 per cent, during the week. The Wire mills, which are already operating at their capacity, are accumulating no stocks, as the jobbers are hurrying forward material, anticipating a shortage next month. So far as deliveries are concerned the Sheet trade shows some slight improvement, but from four to six weeks are still required to fill orders of miscellaneous sizes and gauges of both black and galvanized. Crop conditions show a steady improvement and the outlook is favorable to a record harvest.

Baltimore.

CARLIN & FULTON.—With the approach of September the fall season may be said to have fully started, and we notice a great activity in our city in general lines of business. Our hotels are beginning to record the influx of Southern buyers, but more particularly in the line of dry goods, notions and such goods as require personal inspection and selection. The Hardware trade, through the use of the illustrated catalogue and the activity of the traveling salesmen, are not under the same necessity of visiting a market in order to purchase a stock of goods, and consequently the sample room is not so necessary an adjunct to the Hardware house as in former years, when the illustrated catalogue was a rarity.

The demand for prompt shipment of goods ordered for future delivery seems to be the rule, and the prudent buyer is apt to anticipate his wants for fear of the usual delay experienced at the time when goods are actually needed by the consumer. The congestion of orders at the factories and the delays in transportation have impressed on the dealers throughout the country the advantages resulting from putting into their stocks goods for which there will be a positive demand, and not to rely too greatly upon prompt shipments at the height of any season. With the market as uniform as it has been for the last few years there has been little danger in the carrying of full and complete stocks, which was not the case years ago, when the production was greater than the demand.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market is still active and altogether in seller's favor. The agricultural reports continue so favorable that a highly stimulating influence is felt on top of present demand. When we read of 800,000,000 bushels of wheat and over three times that of corn, when we see preparations for 12,000,000 bales of cotton and realize the wealth that these mean to the whole country, little wonder if we expand in our ideas of what will be wanted in the way of supplies to harvest, house and transport. The railroads seem insatiable and are making their purchases far into the future. There was never such demand for labor, and its ranks are lined up with

well paid men and women in consequence. But with any temptation in the way of pay there is still more work to do, and as the work at Panama seems to demand the help of our friend the Chinaman, so we may have to call on him in other places to pull us through—we, the hitherto self-sufficient people of the Occident. Maybe San Francisco will lower the bars of the Golden Gate a little while, in order to push along the work of rebuilding.

Rates for money are full and likely to remain so for a while; the banks are likely to make an excellent showing for the last six months of the year. We still find trouble in getting the country banker to understand that not all expenses should be paid by the city creditor. Excessive charges on drafts and checks force collections out of their usual channels. So many new banks have been started in the last year or two that it would be surprising if many of the novices did not get the idea that the seller will stand any sized rake off that the collecting bank might make. Goods are sold on the contrary with the understanding that payment shall be made at par and that no discount, besides the one for agreed prompt cash, shall be suffered.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The midsummer season (contrary to what we generally expect at this time) finds us with a more than fair volume of trade, and it seems as though the usual business traditions which generally prevail at this time of the year have been either ignored or forgotten.

From all sections we hear the same reports, which, with the 1906 record breakers for big crops, would seem to confirm the general optimistic feeling which prevails, and there is nothing in sight which would indicate a cessation of the generally healthy business conditions. Of course something might occur which would unsettle things, but it would have to come like a thunderbolt from a clear sky, and the business horizon, as far as we can judge, indicates no storm in any direction. Collections are good and the general volume of trade shows no diminishing.

We noticed an account of the Railroad Traffic Managers, in which they say the country's greatest prosperity is in sight. They give the total value of all agricultural products at nearly \$7,000,000,000 for 1906, being an increase in value over 1905 of over \$71,000,000. This is certainly a remarkable exhibit, and represents to the roads concerned a gross increase of 12 per cent.

Steel demands are heavy and purchases immense. The general report from the manufacturing centers is that every one is full of orders, and the difficulty is to get goods. In our own business there is great scarcity in very many lines and some manufacturers seem to be almost snowed under, and it is only by incessant drumming that we succeed in getting goods, all of which, of course, shows a more than healthy condition of general business. We trust that there will be nothing to put a check upon the advancing business prosperity.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—July has been the heaviest fall month the Southern Hardware jobber has had for years, and the prospects are for a heavier business during August. With cotton growing nicely and so far nothing to prevent a heavy crop; with prospects for a good corn crop; with a fine wheat crop just harvested; with the fruit and melon crop heavier than could be saved, unless we have some very unseasonable weather in the next few weeks we see nothing to prevent a record breaking fall and winter business, and our greatest trouble will be keeping stock enough to fill orders we are receiving and are sure to receive.

We are surprised to learn that some of the large jobbers are selling general bills of Hardware and giving future dating. While we know that the instances are rare we are unable to find any excuse for it whatever. Never was there time when it was easier to get business, when the dealer was more able to pay promptly, and while it is hard to get a dealer to keep a price he has been named confidentially it is impossible to keep him from

advertising the fact that he is receiving dating from this or that man.

We think the jobbers working this territory are cutting out even the small amount of dating they have been allowing. It is not a time when dating or cut prices are appreciated; the dealer is too busy to think of it, and the jobbers should never be too busy to ask a profit, and they are doing it, as we hear scarcely any complaints of prices being cut.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Business continues in large volume. All the indications point to an exceedingly heavy trade during the fall and winter months.

A well-known catalogue house of Chicago has recently issued a new catalogue. A study of this catalogue is interesting. In the Hardware line practically all manufacturers' names have been omitted. A comparison of prices with former catalogues shows many sharp advances. Some goods upon which the market has advanced have not been changed.

If any one in the trade is in doubt in regard to the improvement in the situation so far as the interests of the retail Hardware dealers are concerned, we suggest they take the time and trouble to compare lines of goods and prices in this recent catalogue with lines and prices in the catalogue of the same house, say, three years ago.

At that time some of the best known and well established lines of goods were advertised glaringly at cut prices in these catalogues. The names of these standard lines of Hardware have practically disappeared from these catalogues. What has been the cause of this change? We hardly think it is necessary to attempt to explain to those who have read the columns of *The Iron Age* regularly the past few years.

The Sporting Goods part of the business, however, does not show the same changes. Many well-known goods in the Sporting Goods line are still advertised at exceedingly low prices—prices so low the retail dealer cannot make a satisfactory profit in competition.

It is said in certain places that the agitation of this catalogue house question in the trade papers has helped the catalogue houses. It is claimed that both jobbing and retail Hardware associations have advertised catalogue houses. We hardly believe this to be true. It must be taken into consideration that practically every farmer in the land is on their mailing list and receives their catalogues regularly. It would be somewhat difficult to add to their advertising.

It must also be remembered the trade papers are not read by the general public. For instance, how much does a Hardwareman know about the subjects being discussed in a dry goods trade paper? They may be making a great "to do" on some dry goods question, but all the other trades not interested in dry goods are certainly totally oblivious to the tempest in that particular teapot.

Every Hardwareman who is at all interested in this subject should ask himself the following questions:

Has the agitation of this catalogue house question the past few years led to more light on the subject?

Has it led to certain cold facts being presented to manufacturers, jobbers and retailers?

Has a study of these facts awakened manufacturers, jobbers and retailers to certain new conditions which have found a place in the trade?

Have manufacturers been led to think more or less seriously on the catalogue house problem, and of the character of their relations to catalogue houses on the one hand and to their jobbing and retail trade on the other?

Have jobbers been led by these discussions to consider their responsibility in protecting their retail trade against the encroachments of catalogue houses?

Have jobbers been led to go over their prices with a view to equalizing certain discrepancies which may have crept in from a lack of proper investigation of other competition besides that of their neighboring competitors in the jobbing line?

In other words, have these discussions led jobbers to wake up to the fact that there was something else go-

ing on in the Hardware world besides merely the manufacturing and jobbing of goods?

What effect have these discussions had upon the retail Hardware merchant?

Has he been discouraged by the facts presented to him?

Have these facts been of a nature to cause him to take life more easily, in the belief that his business was safe and secure?

On the other hand, have the articles he has read on this subject, added to a review of his experiences in his own business, led him to realize he must be more energetic, more progressive, more aggressive and up to date in his methods?

Has not this catalogue house question had a great deal to do with the large increase in the membership of State retail Hardware associations?

Some critics have referred to the statement of sales made by a certain catalogue house as showing how ineffectual is any work against them. Just because they have sold very largely of Hardware, Sporting Goods and kindred lines do these critics recommend that all those whose interests in this question are different from those of the catalogue houses stop further effort in defense of their own interests?

Is not the very statement issued by this catalogue house, of the volume of its sales, the best possible argument for the necessity of the existence of organized opposition to the development of this class of business?

Has consideration been given to the fact that several catalogue houses have failed in the past year or two? Have we heard of any new catalogue houses entering this field?

We are advised the members of the Catalogue House Committee are steadily at work. In Washington, at the meeting of the National Hardware Association last year, this committee announced in their work in future they would, as far as possible, avoid undue publicity; but because they have not been heard from very much in the trade papers those who are interested in the catalogue house movement must not gather the impression there has been any diminution in their efforts.

Portland, Oregon.

FAILING, HAINES & MCCALMAN.—Usually we do not like to say the same thing over and over again, but as long as business keeps as good as it is at present we are perfectly willing to keep on saying so. There has been none of the usual summer dullness to date (August 8), and to all appearances there will be none, as August is opening up with a very good trade. Collections do not seem to be any more difficult than they were earlier in the year, and at present over 50 per cent. of our customers are discounting their bills.

Crops are good, except in a few places not enough to affect the average, and prices will probably be more than fair.

Building is brisk all through our territory, and new settlers are coming in, most of them with money to spend on homes and business. Taking it altogether, all business in this territory is first class.

Cleveland.

THE W. BINGHAM COMPANY.—Copious rains and a hot sun go a long ways to make a big corn crop, and everything points to a record breaking crop of corn and wheat. Trade and traffic are excellent.

Many of our travelers are back on their routes, and we are receiving many orders for daily wants from our customers. In a few days we will send forward shipments of Sheet Iron, Elbows, Stove Boards, Coal Hods, Dripping Pans, Axes, Meat Choppers, Stuffers, Coal Shovels, Scoops, Crosscut and Buck Saws and Lanterns that were sold early in the season for the middle of August or September 1 shipment. The advice we gave to our friends to buy early on account of scarcity and price we are glad to say was taken, and now they will reap the benefit of prompt shipment and low prices which they received early in the season.

We advise our friends to place their orders at once

for Lawn Mowers, Shovels, Spades and Steel Goods for spring shipment. Advances in material and labor and the plentiful supply of money will warrant higher prices than are at present being obtained. Under our agreement with customers on future orders they are perfectly safe and their wants are always covered.

Just at this time there is a large demand for Preserving Kettles, Enameled, Brass, Copper, Aluminum, Cast Iron and Tin, as large quantities of small fruits are being put up for winter use. Jobbers' stocks are well assorted on these lines, and customers should enter their orders early. There is a very large demand for Merchant Pipe and Cast, Malleable and Brass Fittings of all kinds. There seems to be an unusual amount of work going on in these lines. Trade in manufacturing, mining and milling supplies is very good.

There seems to be a lull just at the present time on the rebate and trust talk. Many people seem to be minding their own business rather than prying into the affairs of other people. If all the large corporations and trusts that have been attacked by the press and yellow journal magazines, instead of spending their money for educational institutions, hospitals, churches, libraries and colleges, would follow the example of some of the most popular men on "easy" street and spend their surplus on the race track, "wine, women and song," and plenty of good cigars to keep the yellow journalists smoking, the assaults on them might cease. A fair man always considers both sides before he renders his verdict.

NOTES ON PRICES.

Wire Nails.—There is a large volume of new business, together with liberal specifications on contracts so that the mills are fully occupied and are given but little opportunity to accumulate stock. Some of them are referred to as shipping direct from the machines. It is generally believed that stocks of Nails in merchants' hands are moderate, and in some cases broken, with a possibility of the development of a shortage during the season. The tone of the market is decidedly firm, and there are rumors that an advance in the near future is not unlikely. There is less disposition than heretofore to make the 5 cent concession on large orders, and as a result the official quotations are more firmly maintained. These quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers..... \$1.85
Carload lots to retail merchants..... 1.90

New York.—Demand is light for small lots from store, reflecting the midsummer quiet. Quotations for small lots from store are on the basis of \$2.10 per keg.

Chicago.—Early indications point to a record month in the Wire trade, both as regards specifications and new tonnage, and as a result of the heavy midsummer bookings trade conditions, from the manufacturers' standpoint, are favorable to higher prices, and there is every probability that an advance will be enforced before the end of the month. Average daily specifications are already 50 per cent. in excess of those received during August last year, and the volume of new business is almost twice as great. Stocks of Nails in the hands of both producers and consumers are exceedingly light, and a shortage during the fall months is anticipated. Price concessions have been withdrawn entirely, even in competitive territories, and a number of independent makers are already asking slight premiums for early deliveries. The following quotations are firmly maintained: \$2 in car lots to jobbers and \$2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The market is without change. Orders continue to be placed freely and producers are doing as well as they can with the shortage of billets and rods. The market is very firm, subject to the concession of 5 cents a keg made on large orders. Official prices, which are shaded to this extent on desirable orders, are as follows: Wire Nails, \$1.85 in carloads to the large jobbing trade and \$1.90 in carloads to retail merchants, f.o.b.

Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—Some delay has been experienced by merchants in receiving prompt shipments, but mills are now catching up with orders. Specifications on contract orders still supply the larger part of the mills' business, though some new orders are being received. Concessions on official prices of 5 cents per keg, f.o.b. Pittsburgh, are understood to be more or less general. Official quotations are as follows: \$1.80, base, for carload lots, f.o.b. Pittsburgh; \$1.85 for less than carloads, f.o.b. Pittsburgh; \$1.95 for carload lots, on dock, New York; \$2 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—Cut Nails, in small lots from store, are in comparatively light demand. Quotations for small lots from store are on the basis of \$2 per keg.

Chicago.—The demand for Cut Nails continues good in the form of specifications on contract orders, and some new business is being taken on by the mills. Railroads continue to be the largest factors in the market, demand from other consumers being light. The following quotations prevail: Steel Cut Nails in car lots, \$1.90 to \$1.95; less than car lots, \$2; Iron Cut Nails, \$2 to \$2.05 in car lots; less than car lots, \$2.10.

Pittsburgh.—Specifications continue good, with mills somewhat behind. We quote Cut Nails at \$1.75, base, f.o.b. Pittsburgh, for carload lots, and \$1.80 in less than carload lots. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

Barb Wire.—Demand in the form of large orders for future shipment and specifications on contracts have caused the mills to fall behind in shipping orders promptly. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted	Gal.
Jobbers, carload lots.....	\$2.00	\$2.30
Retailers, carload lots.....	2.05	2.35
Retailers, less than carload lots.....	2.15	2.45

Chicago.—Large orders for future delivery from the Hardware trade are being received by the mills much earlier than in former years, and specifications, especially from the railroads, have been so heavy this summer that prompt deliveries cannot be secured. Prices are firmly maintained on the following basis: To jobbers, Chicago, car lots, Painted, \$2.15; Galvanized, \$2.45. To retailers, car lots, Painted, \$2.20; Galvanized, \$2.50; Retailers, less than car lots, Painted, \$2.30; Galvanized, \$2.60; Staples, Bright, in car lots to jobbers, \$2.10; Galvanized, \$2.40; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Buying is good and well distributed. The official prices, which are occasionally shaded 5 cents on desirable orders for carload and larger lots, remain as follows: Painted Barb Wire, \$2, and Galvanized, \$2.30, in carload lots to the large jobbing trade, with the usual advance of \$1 a ton to retailers in carload lots f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Demand from the various sources is so large that mills are unable to make prompt shipments. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads \$1.70
Retailers, carloads 1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—The requirements of all classes of Wire for manufacturing purposes surpassed all records for this season, and the added demand of the Woven Wire Fence makers has increased the pressure on the mills and deliveries are being further deferred. Quotations are unchanged, as follows: Jobbers, \$1.85, f.o.b. Chicago, in car lots; retailers, \$1.90.

Pittsburgh.—New orders are in good volume, while specifications on old contracts are coming in very freely. Prices are quite firm, but are occasionally shaded 5 cents per 100 lb. on desirable orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads\$1.70
Retailers, carloads 1.75

The above prices are for base numbers, 6 to 9.

Bale Ties.—Single loop Bale Ties were advanced 5 per cent. last week, although double loop and other patented types are unchanged in price. The enhanced value is entirely due to the extraordinary demand growing out of the large tonnage of hay that is being baled this season to relieve sections where the crop was light.

Rope.—Manufacturers refer to demand as very satisfactory and as somewhat ahead of what is expected at this season. Number 2 quality of Sisal Rope is more or less weak in price, though no change has been in regular quotations. The low price of Istle hemp, of which this grade of Rope is largely composed, is responsible for concessions of from $\frac{1}{4}$ to $\frac{1}{2}$ cent per lb., from regular quotations, according to the desirability of the order. It is reported that under certain conditions a slightly lower price than the above has been made. Quotations are as follows: Pure Manila, $12\frac{1}{4}$ @ $12\frac{1}{2}$ cents; B quality, $11\frac{1}{2}$ cents; Pure Sisal, 9 cents; No. 2 quality, $7\frac{3}{4}$ cents per pound.

Vitrified Sewer Pipe.—The market for Vitrified Sewer Pipe is now an open one, as the combination which has for some time prevailed has been dissolved. It is understood that this action was taken in apprehension of an investigation by the Federal authorities. As a result prices are a good deal demoralized, with much irregularity in current quotations. The yards of the 18 concerns which composed the combination are reported to be full of stock, particularly of the large sizes, and these stocks being thrown upon the market have contributed to the existing demoralization. Some of the quotations which are current are referred to as below the cost of production. One element in the existing irregularity comes from the fact that freight is so large a part of the cost of Sewer Pipe, and without an understanding among the manufacturers it is on this account difficult to secure anything like uniformity in quotations. As indicating in a very general way something of the range of existing prices it may be noted that some of the manufacturers are quoting first-class Standard Pipe, 3 to 24 in., at discounts ranging from 85 to 86 per cent.; second-class Pipe being quoted at about 90 per cent. discount. These prices are f.o.b. factory. The future course of the market will be watched with interest, especially in view of the fact that some efforts will perhaps be made to put the market upon a more even and substantial basis than at present. It is, however, generally thought that there are serious difficulties in the way of the carrying out of any such project.

Galvanized Ware.—An advance of 5 per cent. in Galvanized Pails, Tubs and Coal Hods was announced last week by leading manufacturers. These commodities have long been used as a basis of competition on allied lines and have been sold according to the statements of the producers at unremunerative prices. It is stated, indeed, that the advanced quotations are little if any above cost with raw material on its present level. Whether the new prices will be strictly maintained by all the manufacturers is of course problematical and the situation is also complicated by the competition of less prominent makers, who are by no means an inconsiderable factor in the market.

Window Glass.—From present indications Window Glass factories will not resume operation before the middle of September or perhaps later. This is the conclusion arrived at by the Amalgamated Window Glass Workers' Association at a recent meeting, and is supposed to meet the general approval of both manufacturers and jobbers. A resumption on September 1 would be likely to impair the value of stocks in the hands of both producers and distributors, which are supposed to be large enough to supply demand for the coming two months. The local

market is dull and weak, at the following prices: Greater New York, single, 90 and 5; double, 90 and 10 per cent. discount. Eastern District, except the Boston District, 90 and 10 per cent. discount for all sizes of single and double strength. In the Boston District quotations are reported as being 90 and 15 for all sizes of single and double strength.

Chicago, by Telegraph.—The Western Window Glass Association, at a special meeting held at the Auditorium Annex, Chicago, Tuesday, August 14, recommended a delay in the resumption of the fall work of all Glass factories in the United States, in order that the Glass market may be made more firm as to prices. A committee was appointed to confer with the manufacturers at a meeting of the latter to be held in the near future on this matter. Present prices of the trade were reaffirmed. Quotations on less than car lots are 90 and 15 per cent. discount on Double, and 90 and 10 per cent. on single.

Linseed Oil.—The market is devoid of special interest, buying being confined to immediate requirements in most cases. Crushers are unwilling to name a price lower than 35 cents for Raw for September and October delivery, while buyers' views are below this figure. New York quotations are as follows, according to quality and seller: City Raw, 38 to 39 cents per gallon; out of town Raw, 36 to 39 cents per gallon. Boiled Oil is 1 to 2 cents advance per gallon over Raw.

Spirits Turpentine.—During the week under review Turpentine advanced to 64 to $64\frac{1}{2}$ cents for machine made barrels and settled back to $62\frac{1}{2}$ to 63 cents, a net gain of 1 cent over our last quotations. The local market followed that of Savannah, where advances were attributed to speculation and buying by large interests. The future course of the market is regarded as uncertain. New York quotations are as follows, according to quantity: Oil Barrels, 62 to $62\frac{1}{2}$ cents; Machine Made Barrels, $62\frac{1}{2}$ to 63 cents per gallon.

F. E. MYERS & BRO.

F. E. MYERS & BRO., Ashland, Ohio, in accordance with their annual custom, entertained their traveling force July 30 to August 2. All of their traveling representatives, with the exception of those in remote territory and in foreign countries, participated, and the coming together was a most profitable and enjoyable one. There was a very thorough shop and product inspection, an exchange of experiences and a systematic explanation of the merits of the Myers line of Pumps, Hay Tools, &c., especially the new goods which have been added during the past year. On the evening of the first day of the gathering the visitors were taken on an automobile ride, and on the following evening, together with the office force and the foremen of the different departments of the plant (nearly 100 persons, all told), they were guests of F. E. Myers, at a sumptuous banquet at his palatial residence. Photographs were taken to commemorate the occasion, one of the traveling force by itself and another embracing the salesmen and office force and foremen. The past year's business has been the largest in the history of the corporation, which has entirely recovered from a destructive fire, having rebuilt, installed new machinery and increased the capacity generally.

THE ANTIGUE HARDWARE MFG. COMPANY has lately been incorporated under the name of the Western Lock & Hardware Mfg. Company, with a capital stock of \$200,000. The incorporators and officers are: John Q. Tufts, president; Orville Ewing, vice-president and manager, and F. R. Greenleaf, secretary and treasurer. The company will soon commence operations in its new plant and hopes to begin the manufacture of its new lines in about three months; in the meantime the business will be carried on as usual in the old plant. Within the next two months a new catalogue will be issued showing the full line of builders' hardware which will be manufactured.

H. L. Asemissen & Sons have succeeded to the Hardware, Stove and Sporting Goods business of Asemissen & Loucks, Plattsmouth, Neb.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

PRIZES FOR READERS OF NEWSPAPER ADS.

HOYT HARDWARE COMPANY, Wellsville, N. Y., recently experimented with a scheme designed to stimulate interest on the part of the public in the firm's newspaper advertisements and to determine how generally the store's announcements were read. The company advertises every day in the local paper, changing the copy each day. The readers of the paper were urged to clip the firm's advertisements for one week, six insertions, and to present the sets at the store. Those handing in the first, thirteenth, twenty-sixth and thirty-ninth complete sets in the order of their receipt by the firm were awarded prizes.

While the results of the experiment were not as gratifying as anticipated the firm was satisfied and expresses confidence that the plan can be made to work to the advantage of the merchant.

So far as newspaper advertising is concerned the firm advises us that the best results have been obtained from specialty announcements, or those featuring one line at a time. Following is a representative ad of the company:

Lawn Mowers

We've left now just seventeen machines, and if you need one you can't better what we have. Self sharpening, rocker adjusting, high wheel and easy running, giving the desired even appearance.

HOYT HARDWARE CO.

A 5-in. double column space is occupied daily, the advertisement having a prominent position in the upper right hand corner of the page. Other recent ads of the firm directed exclusive attention to Bathtub Seats, Sleeve Boards, the padded kind, which were priced at 17 cents each; Hose, of the competition sort, offered at 7½ cents; Hand Spray for the bath, which was described as "the finest finisher for the bath yet produced short of an expensive shower bath"; and Waterproof Aprons "for men handling ice, washing carriages, for the woman at the washtub, and for numerous other wet propositions." Freezers and Refrigerators were advertised together as "two cold producers." "Lice, Fleas, Worms, The Plagues of Egypt," was the catch phrase used with an insecticide Sprayer ad. The same general typographical style is followed in all the firm's announcements.

CASH SALE REBATE PLAN.

BARD & CHENEY, Hardware, Plumbing, &c., Port Allegheny, Pa., have adopted a rebate plan which they believe is largely increasing their cash business and bringing many new customers to the store. Only a few days since a lady entered the store and asked to look at Pans. She explained that she was buying for a neighbor, who told her to be sure to go to the "red front store" (another of this enterprising firm's advertising schemes), as there "she might get a rebate of half the amount of her purchase."

One Day in Each Month

is "Cash Rebate Sale Day." The day chosen is that one the cash sales of which figure the nearest to the daily average cash sales for the month, and cannot of course be selected until the month is out and the returns of the business computed.

A Sales Slip

is handed to each customer on which the date of sale, customer's name and address and particulars of the goods sold and their prices are given. A duplicate of each sales slip is kept by the firm.

Premium Equals About 2 Per Cent. of Month's Total Cash Sales.

The determination of the amount of rebate to customers is a matter which each merchant may decide for himself. He may choose to return half the money, or a little more or less. Bard & Cheney make it 50 per cent., which, according to their experience with the plan, figures out about 2 per cent. on the total cash sales of the month.

Method of Announcement.

When the firm has determined on the premium date the fact is announced on large cards in the window and store and also in the store's advertisements in the local papers. One of these ads is reproduced below:

A SMILE THAT WON'T COME OFF

Adorns the faces of our patrons since we announced

Wednesday, June 13th

To be our second

CASH REBATE SALE DAY

This day was chosen because the amount of our cash sales on it was nearest the daily average for June.

If you have a Cash Sale Slip bearing this date return it to us and we will give you half its face in Cash.

We are able to make this generous rebate because our increased cash receipts permit us to take advantage of more cash discounts and buy on larger quantities.

There is No Reduction in Our Quality

**WE WILL HAVE ANOTHER
Cash Sale Rebate Day
THIS MONTH**

Save your Cash Sale Slips that you may know the Amounts and Dates of your Purchases.

Fruit Jars. If you go to the trouble and expense of canning fruit you don't want it to spoil. The only safe way is to use our patent jars. One or two quarts saved will make up the difference in cost. Pints 90c. Quart \$1.00. Two quarts \$1.35 a dozen.

BARD & CHENEY

Hardware

Plumbing

The Red Front Profit Sharing Store,

Telephone 5 a.

As noted above the plan is working admirably, and the firm states that it will be pleased to give any further particulars which may be desired by merchants interested in it.

Franz Hardware Company has succeeded to the business of Franz-McCain Hardware Company, Webb City, Mo.

The Hardware firm of Herr & Snively, Lancaster, Pa., has been dissolved, and the business will be continued for the present under the old style by C. R. Herr.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM THE UNITED SALES COMPANY, 204 Dearborn street, Chicago, which desires catalogues and other printed matter from manufacturers and jobbers of Hardware specialties.

FROM WATT & HOLMES HARDWARE COMPANY, Cordele, Ga., which has recently purchased the stock and building of the Ocilla Hardware & Supply Company, Ocilla, Ga., and requests printed matter relative to General Hardware and Mill Supplies.

FROM WOONSOCKET SUPPLY COMPANY, Woonsocket, R. I., which has been incorporated to deal in Hardware, Electrical Goods, Mill Supplies, Plumbing, &c.

FROM KIEFERLE & WILLIAMS, who have purchased the Hardware, Stove, Implement, Paint and Sporting Goods business of Wm. Dissmeyer, Marion and Lincolnville, Kan.

FROM G. KRENZIEN, Stanton, Neb., who has bought the Hardware store of A. M. Wagner & Bro.

FROM THE THEDINGA HARDWARE COMPANY, Monroe, Wash., which has been incorporated with a paid up capital stock of \$7500. The company will carry on a general retail Hardware and Agricultural Implement business, including also Logging Tools and Buggies.

FROM MILLER HARDWARE COMPANY, 368 and 370 Massachusetts avenue, Indianapolis, Ind., which has been incorporated with a capital of \$20,000, and opened up for business on Saturday, 11th inst. The officers are Wm. E. Miller, president; Chas. Thielmann, vice-president, and Chas. E. Monfort, secretary and treasurer. The company handles general Hardware, House Furnishings, Paints, Glass, &c.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

ELDRIDGE & WINNEK, 128 Pearl street, Boston, Mass.: Illustrated price-list of Imported Ice Skates, for the sale of which the firm is sole agent for the United States and Canada. The eight-page circular shows a number of patterns, the prices of which are said to be exceptionally low.

EAGLE LOCK COMPANY, Terryville, Conn.: Leaves for insertion in its catalogue, relating to Trunk and Pad Locks, Wicket Locks, Secret Rim Gate Latches, Mortise Cupboard Latches and Drawer Locks.

TWENTIETH CENTURY MFG. COMPANY, Mansfield, Ohio: Circular illustrating and describing the No. 1 Improved Twentieth Century Washing Machine.

THE SHELBY SPRING HINGE COMPANY, Shelby, Ohio: Catalogue No. 12, devoted to Double Acting Floor Hinges, Steel Drawer Pulls, Sash Lifts, Door Pulls, Cupboard Catches and Turns, Sash Locks, Barrel Bolts, Chain and Foot Bolts, Detachable Screen Door Hinges, &c.

THE KRAMER BROS. FOUNDRY COMPANY, Dayton, Ohio: A hanger in colors relating to the Little Gem Stove Truck.

COVERT'S SADDLERY WORKS, Interlaken, N. Y.: Illustrated catalogue and price-list, No. 22, relating to

Trimmed Neck Yokes, Neck Yoke Centers, Harness Snaps; Rope, Web and Chain Goods, and specialties in Saddlery, Coach and General Hardware.

CHICAGO SPECIAL TRAIN TO ATLANTIC CITY.

A S usual a special train will be run from Chicago to Atlantic City in connection with the annual conventions of the American Hardware Manufacturers' Association and National Hardware Association, October 17, 18 and 19, at the Marlborough-Blenheim. The special will leave the Union Station, Chicago, on Monday, October 15, at 3 p.m., and is due to arrive at Atlantic City at about 4:30 p.m. on the following day. The arrangements for the train are under the efficient charge of W. H. Bennett, Room 403, 40 Dearborn street, Chicago, who will be pleased to hear promptly from those who desire reservation made for them.

TRADE ITEMS.

A MEETING of the directors of the New England Iron and Hardware Association was held at Boston, Tuesday, August 7. President R. M. Boutwell announced committees for the year 1906-1907, and a Manufacturers' Committee was added, embracing representatives of the 30 manufacturing concerns already members. It is hoped to stimulate the interest of the latter in the work of the association, which will be vigorously carried forward under the new administration.

THE next annual convention of the Inland Empire Implement and Hardware Dealers' Association will be held on January 16 and 17, 1907, at the Hotel Spokane, Spokane, Wash. While there will probably be a number of exhibits made by manufacturers and jobbers, as heretofore, this will not be done under association auspices. The hotel has quite a number of sample rooms and arrangements for their use should be made direct with the hotel management. A year later, however, when the projected new armory building will, it is hoped, be completed, the association will probably undertake the presentation of exhibits on the lines followed by a number of other Hardware organizations.

AMONG THE HARDWARE TRADE.

L. C. & G. A. Mittelstadt, Laurel, Neb., have sold out their furniture stock, and will continue in the Hardware and Harness business.

Gardiner Hardware Company, Canton, Ill., has increased its capital stock from \$3000 to \$5000.

Rupert Hardware Company, Limited, has been incorporated in Rupert, Idaho, with a capital stock of \$10,000.

The stock contained in the warehouse of Cass-Smurr-Dameril Company, Los Angeles, Cal., was recently damaged by fire to the extent of \$3500, fully covered by insurance. The company carries a wholesale and retail stock of Shelf and General Hardware, Stoves and Tinware.

Davis & Darnell have succeeded Hatchett & Darnell in Dill, Okla., and will carry a retail stock of Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods. A line of furniture will be added. The firm is occupying a new store building.

The Funkhouser-Davis Hardware Company, West Plains, Mo., has bought the furniture and undertaking business of McCulloch & Son. The company now occupies seven large floors, and the lines carried include General Hardware, Agricultural Implements, Vehicles, Stoves, Queensware, Furniture, Harness, Sporting Goods, &c.

Correspondence.

"2 Off 10 Days."

To the Editor: With reference to the excellent article by W. L. Brownell on the "Abuse of the Terms 2 Off 10 Days" in your issue of August 9, the writer is pleased to state that he proposes to adopt Mr. Brownell's suggestion of allowing 1-10 of 1 per cent. for prepayment.

The writer, however, would be glad to have Mr. Brownell's opinion on a similar "abuse of terms" in reference to the actual date from which discount is to be made. Our invoices, for example, are dated the day of shipment and accompany the bill of lading. We expect our customers to take discount from this date, but we have any number of them who take discount from the date of arrival of the shipment.

MANUFACTURER.

CHATTANOOGA ROOFING & FOUNDRY COMPANY, Chattanooga, Tenn., has established a New York office at 440 Greenwich street, under the management of Wm. L.

Michigan Retail Hardware Association.

PLEDGES of substantial financial aid for defense, loyal support and unqualified indorsement of the prosecution of the past year's campaign were given the officers of the National organization by the Michigan Retail Hardware Association, in twelfth annual convention at the Hotel Cadillac, Detroit, August 8, 9 and 10. Cognizance of delayed freight shipments by the railroads was also taken, and a resolution adopted favoring the enactment of laws which will empower the Interstate Commerce Commission to regulate the per diem travel, with redress to the consignee for failure of delivery within the prescribed time limit.

That the association movement is in its ascendancy rather than on the decline, either in influence or membership, was indicated by the unbounded display of enthusiasm, attendance and enrollment of new members at this meeting, and the growing appreciation of this work with the retail Hardware merchants of the country was indicated by reports from nearly all of the State organizations of increased membership and of the formation of new associations in other States.

Accessions to the roll of the Michigan body during the convention numbered 44, in the year prior to the meeting 118, and the membership now totals 684, showing a 12 month increase of 163.

The cordiality of the welcome, hospitable reception and elaborate entertainment accorded the visitors led to the acceptance of a pressing invitation to meet again in the City of the Straits next year.

The displays of manufacturers and jobbers were on a greater scale than heretofore, and more would have shown their goods provided accommodations could have been secured at this commodious hostelry, where all the exhibits were gathered.

Two days were given over entirely to business, while on the morning of the third the visitors were given an opportunity of visiting the local jobbers and manufacturing establishments, and in the afternoon and evening they were taken on a river and lake ride to Bois Blank Park, where supper was served.

Over 300 members, many accompanied by their families and clerks, were present, and honorary memberships were granted to 200 salesmen and manufacturers.

Convention Committees.

Following the morning meeting of the Executive Committee the opening session was held in the large assembly hall of the Cadillac on Wednesday afternoon. Hon. Geo. P. Codd, mayor of the city, welcomed the members with an eloquent address and response was made by J. H. Whitney, president of the association. The president then announced the appointment of the following committees and convention officers:

Latta. A stock of the company's products, including Grates, Fireplace Trimmings, New Century Metal Shingles, &c., will also be carried.

NATIONAL ENAMELING & STAMPING COMPANY'S CATALOGUE.

NATIONAL ENAMELING & STAMPING COMPANY, Milwaukee, Wis., has just issued catalogue No. 7, illustrating and describing its lines of goods. Nine full page views are given of the company's principal factories and warehouses, also views of the exterior and interior of its offices and salesrooms, 374-378 Broadway, New York. For convenience the goods are arranged in sections, with a sectional index, which enumerates the kinds of goods in each division. Each item is also covered in a general index. In addition to six different lines of Enameled Ware, Tin and Galvanized Ware, are included Gas, Oil, Wood and Coal Stoves and Heaters; Ovens and Coal Vases; Wrought Steel Seamless Kitchen Sinks and Plumbers' Supplies.

CREDENTIALS: S. S. Boyce, Port Huron; Walter W. Caple, Alma; J. J. Vander Meer, Grand Rapids.
CONSTITUTION AND BY-LAWS: Paul E. Dunham, Lansing; A. G. Schoeneburg, Saginaw; O. H. Gale, Albion.
RESOLUTIONS: M. W. Callaghan, Reed City; A. Harshaw, Delray; I. Lee Truax, Bennington.
QUESTION BOX: P. A. Wright, Holly; D. L. Whitenock, Tecumseh; R. G. Ferguson, Sault Ste. Marie.
PRESS: C. E. De Clements, Detroit; F. C. Goddegree, Bay City; Fred Ireland, Belding.
AUDITING: George P. Griffin, Albion; S. W. Winchester, Jackson; John Popp, Saginaw.
NOMINATIONS: J. B. Sperry, Port Huron; C. M. Alden, Grand Rapids; Frank Brockett, Battle Creek; R. M. Porter, Williamston; Chas. Rounds, Yale.
LEGISLATION: C. L. Glasgow, Nashville; A. Harshaw, Delray; W. E. Bosley, Marshall.

H. G. Mulholland, Pottersville, was appointed sergeant-at-arms.

President Whitney's Address.

After the reading of the minutes of the last meeting by Secretary A. J. Scott, Marine City, President J. H. Whitney, Merrill, delivered an able address, which comprehensively reviewed the work of the year, in part, as follows:

When we take a retrospective view of the many changes that have taken place in the commercial world since our organization, we are filled with wonder and surprise and marvel as to what the future has in store for us. The epoch through which we have just passed will long be remembered for the rapid strides that have been made in the commercial world. It is a condition that confronts us, as to what the results of this remarkable growth will be.

THE SUCCESS OF A NATION

depends upon the prosperity and intelligence of its people. No nation enjoys such universal peace and prosperity as does ours at the present time. Yet we cannot look into the future without serious apprehension. The combination of capital, the formation of trusts and the tendency of doing things on a gigantic scale, all of which is the result of our continued prosperity, makes it imperative upon us to adjust ourselves to the conditions that confront us, that we may be able to keep pace in the march of progress and not fall by the wayside.

The past year has been the most notable one, in many respects, in our history. Greater efforts have been made to influence legislation than ever before, and but for the

POWERFUL INFLUENCE OF THE GREAT TRADE ASSOCIATIONS,

the chief of which is the National Retail Hardware Association, we would to-day be confronted with parcels post and post check and the consolidation of third and fourth class mail matter, the adoption of which would have been a serious blow to the retail interests of the country.

Early in the session of the Fifty-ninth Congress it became evident that a determined effort would be made

to have these measures adopted. Upon the recommendation of the Joint Committee a correspondent was engaged at Washington to keep in touch with these matters, and as a result of this we were promptly informed of every move that was made, thereby enabling us to flood the Post Office committees with letters protesting against them.

The Parcels Post bill was beaten early in the session. The post check scheme was energetically pushed by a big bureau of ex-post office officials, maintained in Washington at great expense by the patentee of the so-called post check currency. Such disclosures were made at the hearings, however, that the committee concluded that the proposition had no place in the Appropriation bill and ought not be adopted. The Consolidation bill met a similar fate.

Much credit is due to the chairmen of the Committees on Post Offices and Post Roads in the House and Senate for their influence against these measures. Also to many of the members comprising the committees.

WARNING AS TO FUTURE LEGISLATION.

But our labors are by no means ended. I believe them to be but just begun. I will give you an extract from a letter that I received from a member of the Committee on Post Offices and Post Roads in the House which, I think, is very pertinent and, in my judgment, merits the careful consideration of every person to whose attention it is called:

I do not think any of these bills will be passed at the present session of Congress. I give you warning, however, that strong influences are behind these bills and are pushing, not only the Post Check bill and the consolidation of third and fourth class mail matter, but also a radical Parcels Post bill.

The farmers everywhere are lining up in favor of all these propositions. Unless the retail merchants, the jobbers and other kindred interests, by an organized effort, through the country press and otherwise, present satisfactory reasons why these measures would not be in the interest of the farmers, Congress will in time be compelled to pass them.

The farmers through the Grange and agricultural publications are being lined up strongly in favor of these measures. Unless you reach these people through the press with logical and convincing arguments your cause will be lost, in my judgment, in the near future.

The sentiments expressed in this letter, to my mind, demonstrate the true situation of the conditions as existing at the present time. It is necessary, then, for us to renew our efforts and continue the fight if we would not have our business taken from us and scattered to the four winds.

OUR SUCCESS AS MERCHANTS

depends solely upon our individual efforts in the community in which we live. If we would be successful we must be alive to the needs of the hour and keep in touch with improved and modern methods. It is necessary that we retain our membership in the association, and to promote its growth and endeavor to induce every legitimate Hardware dealer in the State to become a member. During this age of combinations of capital and merging of interests it is necessary for us to do this, that we may be better enabled to combat the evils that arise, as this can be done only by earnest, united effort. The experiences of the past year prove to us conclusively the wisdom of successful organization and co-operation.

INFLUENCE OF TRAVELING MEN.

In 1905 your Executive Committee adopted a resolution admitting traveling men to the association as honorary members. This action was approved of at the last State convention. It gives me great pleasure to testify to the wisdom of this action, as nothing has ever been done, in my estimation, that has resulted in greater benefits to us than this. In this honorary membership we have traveling representatives to speak a good word for us and through their efforts many applications for membership have been received. Let us regard them as our true friends and faithful allies.

MUTUAL FIRE INSURANCE.

One of our most important items of fixed expense is that of fire insurance. The different Hardware mutual fire insurance companies furnish us means of carrying the bulk of our fire insurance at reasonable rates. The fact of the returning of from 25 to 40 per cent. of the board rates to the insured is one of the strongest arguments in favor of membership in our association that we have. All the Hardware mutual fire insurance companies are organized on a safe basis and are conducted in a conservative manner, and are worthy of the consideration and patronage of our entire membership.

STRONGER THAN EVER.

While our membership has not increased in numbers during the past year as much as it has in some of the

years gone by, yet we have had a very substantial growth and at the present time are stronger than ever. We have a membership that is loyal, and one which has a strong fraternal spirit, thus insuring to us beneficial results that will be permanent and everlasting. Let us devote our best energies and thought to the business we have in hand, and when the work of the convention is completed let us feel that the time has been profitably spent and that we will go to our several homes feeling well repaid, realizing that we will be better enabled to perform the work which is before us during the coming year.

Treasurer Weber's Report.

The report of Henry C. Weber, treasurer, showed the association to be in a flourishing condition financially, the receipts for the year amounting to \$5139.28 and expenditures \$3507.99, leaving a balance of \$1631.29.

Report of Secretary.

Secretary A. J. Scott then reviewed the year's work of his office, his report being, in part, as follows:

We have had to depend entirely this year upon our members, both active and honorary, to get in those who did not belong to the association, and the following in figures will show you that by putting our shoulders to the wheel we have made a most creditable record. The traveling men who have gone out of their way to put in a word for the association and have brought in a large number of the applications received are entitled to particular credit for their assistance, and I hope that we may have their continued support in this work. In my report a year ago it was shown that we had 546 members. Of these 18 are either dead or have gone out of business and 7 have resigned, leaving 521 of our old members still on our list.

We took in 23 new members at Saginaw, have received 33 applications by mail, 4 through the influence of the Minnesota Insurance Company, and have secured 56 applications through the work of our friends, the traveling men, while C. F. Lewis of Pentwater brought in two of his neighboring Hardware dealers, making a total of 118 new members and a present membership of 639. [As a result of many accessions during the convention the membership is now 684, as noted elsewhere.]

COINCIDENT WITH THE ABOVE GROWTH

in our own association we have found similar conditions existing in all other State associations affiliated with our National Association, and there are unfortunately a few interests which are becoming unnecessarily alarmed at this great increase in the strength of the organization movement. They are even now trying to cast odium upon the officers of our National Association in an effort to discredit in the minds of the Hardware dealers the good work which these estimable men have been doing in our interests during the past few years. False and misleading statements have been made and circulated, to the effect that the members of the different State associations are resigning because they fear the effects of a couple of lawsuits entered against the National officers by those who are trying to disrupt the organization. In view of the figures which you have just heard read, showing a steady growth in members, our traducers seem to have used very poor judgment in selecting a point of attack.

Inasmuch as we have representatives here from both the National Hardware Association and the American Hardware Manufacturers' Association, who represent all the representative wholesalers and manufacturers of the country, and who I believe bring with them the best wishes from their respective organizations, it is not hard to figure that if our methods and our past efforts are in their opinion directed along lines which are in the best interests of the Hardware trade, as a body we need have no fear from any attacks coming from any other source.

You are all familiar with the facts surrounding the decease of two institutions during the past year, whose operations have been very annoying to the retail merchant. The regular mail order houses, however, continue with us, and have during the past year been as active as ever in their efforts to get

A SUBSIDY FROM THE GOVERNMENT

in the nature of a Parcels Post bill and a Post Check currency bill to facilitate the sending of money through the mails. They would undoubtedly be enjoying at our expense the benefits of these two pieces of legislation had it not been for the solid opposition presented by our State associations and other mercantile bodies who understand the grave results which would follow the passage of such bills.

SPORTING GOODS DEALERS.

The Joint Catalogue House Committee has had an exceedingly busy year, and offered several recommendations which their experience in handling the different propositions which came before them taught them would assist materially in competing with catalogue houses. Among other suggestions was one to the effect that legitimate Sporting Goods dealers be considered eligible for membership in the various State retail Hardware associations. This was prompted by the fact that a large number of Hardware dealers handle Sporting Goods, and as the mail order concerns are in many cases quoting Guns and Sporting Goods at unreasonably low prices, and in other ways have attempted to demoralize the trade of the retailer in these lines, it was felt that the assistance of the legitimate Sporting Goods dealers would be valuable in improving these conditions.

GRIEVANCES.

I believe it would surprise even those who have the fullest faith in the ability of the organization to correct trade evils to learn of the widespread desire upon the part of manufacturers and jobbers to help us keep trade in its proper channels. If we had shown any disposition to ask for anything unreasonable I believe that we would have been unable to accomplish what has been done, but requests have always been made with due respect to the interests of the manufacturer and the wholesaler, and our members have shown a keen sense of justice in the complaints which they have brought in. In most cases we have been able to effect satisfactory settlements without resorting to any but the most peaceful methods, and in very few cases has there been any unpleasantness in our work of adjusting these matters.

I am sure that the large attendance at this and at our Saginaw convention was partly the result of placing one of our souvenir programmes in the hands of every Hardware dealer in the State. While many of them could not come to the convention, I believe they appreciate the souvenir of the occasion in that form, and I hope that it will be preserved and referred to. I also hope that those of us who did come will return home with the determination to work even harder in the future than we have done in the past in the interest of the association, so that we can reap to the full the benefits which, with the present strength of our association, now lie within our reach.

"Fixed Retail Prices on Standard Goods and Their Effect"

was the subject of an able paper read by O. J. Darling, secretary of the Detroit Retail Hardware Merchants' Association, which will be published in a later issue. The topic was discussed at length, and the consensus of opinion was favorable to the maintenance of fixed prices on the so-called standard lines. Henry C. Weber stated that whatever measure of success he may have achieved in business was not so much due to holding to fixed prices on standard lines as to making all his goods standard by standing back of their quality.

It was suggested by E. M. Bush, president of the National Retail Hardware Association, that the price established by well-known manufacturers was usually the minimum at which they should be sold, but he added that the merchant could not be prevented from securing a higher price if he could do so, especially on goods realizing only a small profit.

Another member related a grievous experience which he recently passed through in his efforts to hold the manufacturers' selling price to the consumer. After taking on a widely advertised brand of Sadirons, he was induced to add another line which sold at a lower price. At the request of the salesman he granted him permission to place the same line with a racket store in his city, and instead of maintaining the price a reduction was immediately announced by this competitor from the set price of \$1.25 to 93 cents. After notifying the manufacturer and receiving no protection, he sacrificed the line at 85 cents. He explained, however, that the action of this maker was exceptional, as he recently notified a Stove manufacturer of a cut on a \$45 Range by a dealer in an adjoining town, and as soon as the facts were established the line was taken out of his hands and placed with another Hardware merchant.

W. P. Bogardus, former president of the National Association, defined standard goods as lines of quality

placed on the market and established largely through earnest and conscientious effort on the part of the retailers in their honest endeavors to give the purchasers the best the market affords and those which they can back with their reputation.

C. A. Peck's Address.

C. A. Peck, Berlin, Wis., secretary of the Wisconsin Retail Hardware Association and also of the Hardware Mutual Insurance Company, conducted under the auspices of the association, made an interesting and forceful address, in which he touched on the economy of mutual insurance as offered by the Wisconsin company and those of other States. Mr. Peck also referred to the benefits resulting from the formation of strong State Hardware associations.

G. J. Kastenbergs Paper.

H. L. McNamara, Janesville, Wis., a member of the Executive Committee of the National Retail Hardware Association, spoke briefly, and the Wednesday afternoon session closed with the presentation of a paper entitled "Our Friends the Jobbers and Their Salesmen," by G. J. Kastenbergs of Greenville, in part as follows:

Almost all business is done on confidence, and it is the confidence the jobber has in the retailer and the retailer in the jobber that makes friends. Unless you have confidence in a traveler and his house pass them up, because you will never be satisfied with your dealings.

The success of the jobber depends upon the success of the retailer just as much as our success depends upon the success of our customer, and you all know to what extremes we will go to help a customer and what interest we take in his success.

The same is true of the jobber; he is ever watchful of the retailer's interests and ever ready to lend him a helping hand when the need of it is shown. Let us never forget this when we are tempted to criticize the jobber for apparent neglect in filling our orders, and let us throw over some of his shortcomings the mantle of charity. It often occurs that we are a party to the offense.

IF WE MADE OUR ORDERS PLAINER

we would have less cause to complain because the jobber did not fill them exactly as intended. Many orders sent to the jobber leave much to be guessed at, and it is surprising they make as few mistakes as they do.

During the busy seasons some jobbers' orders from salesmen and the mails can be numbered, not by the dozen, but by the hundreds in a single day, and to interpret and fill all of these correctly means much effort and does not leave much time for guessing. It behooves us therefore to make our orders so plain that guesswork will not be necessary. If you are tempted to specify on your order an item, "same as last," don't do it, as there may be 99 others doing the same thing that day, and if yours is properly specified you are guaranteed prompt shipment.

Some retailers are inclined to criticize the jobber because he asks for money due him. No jobber will ask before it is due, and we cannot take offense when so asked. I have known retailers to discount Stove or implement bills at 5 or 10 per cent., and let jobbers' bills run 30 to 60 days past due in order to do so. This is not just, and is on a par with the consumer who sends his cash to the catalogue house and asks the home merchant to trust him.

WE OFTEN COMPLAIN BECAUSE THE JOBBER SOLICITS

the trade of the local manufacturer or some dealer on the street who is not a legitimate Hardware dealer, but do we do all we can to help him? Let us ask ourselves the question if we patronize the jobber as much as we can, or if we try to buy all we can of the manufacturer direct. In buying some lines many retailers use the jobbers merely as a convenience, buying articles in half dozen lots they would not think of buying of manufacturers in less than two or three dozen lots. Too liberal buying of this kind has been the downfall of more than one retailer, and has kept others hard up.

COURTESY TO THE SALESMAN.

It is to our interest to treat the traveling salesman courteously at all times, because he is in a position where we can learn much from him. With his varied experience he can often place us in position to overcome obstacles that present themselves, and if we will stand by him he may do us a good turn when we least expect it. It is he who is the go-between between the jobber and the retailer. It is he who takes our part in a controversy with his house and rights our wrongs through his influence.

The traveling salesman's capital is the trade he controls, and that he controls a good portion of the trade he calls on none of us will deny. By being ever watchful of his customer's interests he makes himself more secure of his position. He is entitled to our respect and consideration, and we must not consider him impertinent if he demands it. His employer sends him out as his representative and he is entitled to the same respect that would be shown the head of the house. His time is valuable and may be limited, but he is always willing to give us any assistance he can. Give the salesman credit for understanding his business. If you have confidence in him do not argue and try to beat him down on every price he makes. Trust him as you wish your customer to trust you. If you have no confidence in him don't buy of him.

Selling Stoves.

A talk on "How to Sell Stoves," by W. T. Leckie, Michigan representative of the Estate of P. D. Beckwith, Dowagiac, Mich., opened the Thursday morning session. He spoke in part as follows:

I believe in order to sell Stoves or any other article the most essential thing is to know about the article one is going to sell, and to know it thoroughly. The next most important thing is to have implicit confidence in the article. In order to have confidence and believe thoroughly in the article I believe you should sell good goods, high grade goods with a reputation, something that will stand up and make good for all of the good things you say for it.

ONE OF THE MISTAKES

I think a great many of the retailers make in buying goods is that they don't listen to the story that is being told them by the man who is selling the article. I believe to-day that the greatest educator with which the retailer comes in contact is the commercial traveler. I do not say this to you because I happen to be one of that unfortunate army, but if you are to know the qualities of the goods you are buying, and you are buying goods to sell, you must listen to the story of the man who sells them to you. I know the average retailer is a busy man, and he often says, "If I spent the time the average traveler thinks I should spend with him I would not accomplish anything."

THERE ARE TWO KINDS OF TRAVELERS.

one is a gentleman and the other is the boor who never knows when to quit. When the gentleman traveler comes to call treat him with every courtesy; in fact, treat him the same as you would a customer. The boor I would show to the door. By listening to the story of the salesman you will understand the merits of the article you wish to sell, and this you should do. It is as necessary for the clerk to know about your goods as it is for you. How many of you take your clerks into your confidence or give them all the information you know about what you are dealing in? I believe the best thing the retailer can do is to educate the clerk on every article that he wishes him to sell. And I believe it is just as essential for the clerk to try and learn and pick up all the knowledge he can as it is for his employer to inform him. There is not a single walk in life to-day that has as many good openings in it as that of the salesman. Every concern, manufacturer or jobber, is always on the lookout for a good salesman, and I believe that salesmanship should be classed with the arts.

THE MATTER OF DISPLAY.

Another very necessary thing in the sale of Stoves is that of display. If you are going to be successful in the sale of any line of Stoves you must display them on your floors. I have gone into stores where I have seen Stoves covered up with blankets or harness or dishpans, and nothing could be seen of the Stove but perhaps the legs. And this man will tell me that he has not been as successful in selling Stoves as Jones over there; that he cannot sell them, and one of the great reasons why he does not sell them is that he does not display them. I believe when a lady walks into a store to buy a Range or any other article it is half sold when it appeals to and strikes her fancy, but it ought to be clean and polished and made attractive.

PAY NO ATTENTION TO YOUR COMPETITOR.

Another thing the retailer falls down on is letting his competitor run his business. A great many times you meet a man in the Hardware business who says, "I have to have goods of a certain price because my competitor has them." I don't think that is necessary. I think if every retailer will handle a good line and present it properly to his customers the other fellow won't run his business. The successful fellow is the one who runs his own business and pays no attention to his competitor.

National President's Address.

E. M. Bush, Evansville, Ind., president of the National Association, outlined the work that is being carried on by that body and referred to the increasing membership in nearly all States as indicative of the widening influence of the organization movement in the retail Hardware trade of the country. He reported that the Illinois Association has had a remarkable growth this year, more than 1000 members being enrolled according to the latest advices he received.

Address of W. P. Bogardus.

The address of W. P. Bogardus, Mount Vernon, Ohio, former president of the National Association, was frequently interrupted with applause. He spoke, in part, as follows:

It has seemed to me to be wise to discuss for a short time the relation that we as retail business men bear to the communities in which we live and to the public generally. I think it will be readily conceded that business men are in somewhat closer touch with the consuming public than any other class. The mere fact that we are constantly catering to their wants and studying their needs naturally brings us into a relation with the consumer

THAT SHOULD BREED CONFIDENCE

on both sides. With this close relation comes of necessity a responsibility that cannot be ignored or avoided—the obligation to deal fairly and justly with all who come to patronize us. A business to be successful must inspire confidence. Your patrons must feel that what you say is true and what you do is fair. Now if that rule applies to the retail trade why should it not apply to all other branches of business?

A MISCHIEVOUS IDEA.

During the last 20 years there has crept into business the idea that success in business consists in the accumulation of money, and that the most successful man is the one who amasses the largest amount of money regardless of all other considerations. With this ambition to get great fortunes has come as a necessary corollary the necessity of combination, the gathering together of large amounts of capital, the consolidation of a large number of individual interests under one management, and thus breaking up competition, which is a thing the trusts and combinations heartily despise and fear.

TO MAKE THE COMBINATIONS JUSTIFIABLE

they must show results—that is, an earning capacity that justifies their continuance. What the means employed to get results matters not to the individuals composing the combination. What they want is interest on their investment. And if one set of officers cannot bring such results they are turned out to give place to others who can. The necessity on the part of the officials to get results forces them to do things that as individuals they would not do. But the constant doing of such acts for the corporation

TENDS TO BLUNT THE MORAL PERCEPTIONS,

and in a short time acts that were done at first with a twinge are now boldly done, and are justified because they bring results. Favoritism, fraud, bribery and corruption soon grow so bold that they are not careful to cover their doings, and then the muck raker comes and rakes over the muck, and then the dear public wakes up and a wave of moral reform goes over the land. Oh, if we could only keep awake! The American people are true at heart, and they are ready to stand by those who demand fair play and equal justice to all. It has been by favoritism that these great corporations have been built up. It will be by fair play and equal justice that their power for evil will be taken from them. When railroads have no favored shippers, when manufacturers have no favored customers, when one man's money will buy as much as another man's, then we can hope for better times.

THE WORK OF THE ASSOCIATIONS

since their inception has simply been a plea for fair play. That something has been accomplished is very evident to all. That our plea will finally receive due consideration I have no doubt.

RESTRAINT OF TRADE.

Some of the large corporations have been charged with and are now being tried for securing rebates from the railroads. Some of the railroads after trial are being heavily fined for giving rebates to favored patrons. All this has been done on the plea that their actions are in restraint of trade. The railroads protest that they are

private property, and the corporations claim that they are private concerns and therefore have a right to make such bargains as they please and that it is nobody's business what contracts they make.

But the courts, looking on from a broader standpoint, say that the railroads have no right to discriminate between patrons and that the corporation is criminally liable when it tempts or forces the railroad to give it special terms and so build the corporation up at the expense of its competitors.

Could it be called in restraint of trade on the part of a manufacturer when he favors some of his trade at the expense of the balance, especially if it can be shown that those who are favored do not take 5 per cent. of his output?

Is it in restraint of trade when a manufacturer sells to a retailer at prices that enable him to sell to the consumer so low that the other retailers are not able to buy the same goods of the ordinary jobber, who, according to the manufacturer, is expected to handle 95 per cent. of the manufacturer's production?

How much difference is there between a railroad that favors some of its patrons to the detriment of the others and a manufacturer who helps 5 per cent. of his trade to undersell the balance, and so make them less able to compete with the favored ones?

In the modern idea of consolidation the basic fact is that organization is for the purpose of breaking down competition. Not so much to reduce the price to the consumer, although they always say that in their prospectus, as to enable the consolidation to raise the price so as to make a larger showing of profit with the avowed purpose of issuing more stock.

An organization that looks to the elimination of competition with the hope that in so doing the profits can be made greater is not for the good of the community.

THEY ARE A MENACE TO BUSINESS

of every kind. They do not benefit the consumer by lowering prices. They do not help the laborer by increasing his wages. They only help a few who manipulate the stock for their own private gain regardless of all others.

WORK OF THE JOINT COMMITTEE.

As to the work of the Catalogue House Committee, to a very large extent it has been successful. But its work is not done and I hope that it will continue until it is done. That it has made enemies was to be expected. Men who are unwilling to be fair are opposed to it. Manufacturers who say that there is a path direct from their factory to the warehouse of the catalogue house are indignant when the appeal is made to them to be fair and treat all their trade alike. And their indignation waxes hot when they have whipped themselves into the belief that the Joint Committee is trying to run their business.

IF THE APPEAL TO MANUFACTURERS

to be fair and treat all alike is telling them how to run their business then the committee pleads guilty. The object of the committee has been and still is to bring the several branches of the trade, the manufacturer, the jobber and the retailer, into such communion and sympathy with each other that their united efforts will be for the better handling of the output of the manufacturer, and for the mutual benefit of all concerned, including the consumer. For it certainly is not to the interest of the retailer to get the consumer to feel that he is being held up in any way.

GOOD HEALTHY COMPETITION

is good for any business. A monopoly tends to greed. To have a cut and slash price competition means simply that those who cut prices do it with the hope of buying up trade, and it generally ends up in failure of those who do it or in the substitution of inferior goods and a misrepresentation of the goods offered for sale.

The most serious problem the retail trade of the country has to solve is the catalogue house question. The man who says that it is of minor importance, and is not hurting him, that he can meet all the prices, and that he is not losing any trade, is simply asleep. Let him go to his railroad depot with his eyes open, or visit the express offices, or make a little quiet investigation at the post office and he will awake to some very unpleasant information. One of the phases of the question is coming to the front in a new way. The catalogue house men, under the guise of the Postal Progress League, are demanding that the question be thrown into politics. Threats are made by this league that if Congressmen oppose their measures then they will go out to commence a campaign to defeat candidates for Congress who are opposed to them. One of their measures is to give rural mail carriers \$4 a day. Have them use two horses and a

wagon to carry parcels on their routes. A route of 25 miles with from 100 to 150 stops cannot be gone over every day for six days per week by any team of horses. If it requires two horses to do the work when the load is but 30 lb., can any two horses do the work with a wagon load? Two horses working alternately can carry the light load, as experience proves. Now if there is a deficit of nearly \$15,000,000 with the present arrangements, how many parcels at the proposed rate will it take to even up the expense when you double the cost of delivery? There is an injustice to the people in the present methods of the Post Office Department in that the burden of the expense of all branches of the Post Office Department is placed on those who write letters. No other branch of the business pays or has paid for years. Is it not better that those who get the benefits should pay for them? Is it fair that 75 per cent. of the expense should be borne by 16 per cent. of the people?

We hear a good deal about fair play and an equal chance for all. But it is not fair play nor an equal chance when any class is favored to the exclusion of any other class.

T. James Fernley's Address.

"The National Hardware Association of the United States; How Can it Best Co-operate with the Retail Merchants of the Country" was the topic of an address delivered by T. James Fernley, Philadelphia, secretary of the National Hardware Association, in part as follows:

At the present time the evil which is most pronounced is that of the competition of the catalogue houses, and side by side with this evil we find that of the Parcels Post, which proposition involves carrying to every hamlet in the confines of our country merchandise sold by the catalogue houses to these various hamlets at a very nominal cost, but at a tremendous loss to our Government.

In combating the first evil the work must be with the manufacturers of the country, while if we would prevent the growth of the second evil we must use our influence with members of Congress. It would seem that we must co-operate as retailers and wholesalers

BY USING OUR INFLUENCE WITH MANUFACTURERS.

as they hold the key of the situation. If they give their extreme prices to the catalogue houses then it is not possible for the retailer to sell at as low a price and at the same time retain a living margin of profit. The retailer must endeavor to carry a variety of goods which will satisfy the wants of the consuming trade upon whose business he depends.

In many instances manufacturers state that the catalogue houses sell some of their most profitable goods, goods indeed which the retail merchant does not carry in stock. We fear that possibly there may be some truth in this statement. If so, is it not wise for the retail merchants of the country to take the position that no goods can be made too fine for them to carry in stock?

Surely if the catalogue houses through a very poorly executed illustration can induce a consumer to purchase a high priced article the retail merchant should have no difficulty in selling the same article when showing it personally to his customer.

Some have made the statement that the retail merchants charge too high a price for their goods. I have no sympathy with this statement, as from the inquiries which I have made in various parts of the country I feel certain that as a rule the retail merchants of the country are asking an inadequate margin of profit.

SUPPORTING THE JOBBERS.

It is generally conceded that the co-operation of the jobbers of the country is essential; this being the case is it not fair to suggest that the retail merchant of the country should to a greater extent support the jobbers from whom he purchases? We know of so many instances where the retailer has been induced to buy from the manufacturer direct, generally purchasing an abnormally large quantity of a given line of goods and frequently paying the manufacturer as high if not a higher price than would have been charged by the jobber.

During the time we have occupied our official position with the National Hardware Association of the United States it has been our pleasure to interview almost every prominent manufacturer of Hardware and kindred lines in this country, and these gentlemen state (almost without an exception) that it costs them more to sell the retail merchant direct than it does the jobber. This being the case we feel that we have a perfect right to ask the retail merchant to at least give the jobber the preference when purchasing goods. We do not ask manu-

facturers to refrain from selling retail merchants, although we would probably be justified in so doing.

JOBBER'S RETAIL DEPARTMENTS.

We realize that most of the large jobbers of the country as well as some of the smaller ones have retail departments, and we think that these gentlemen owe it to their customers that their retail price should be as high as those of any of the retail merchants with whom they attempt to do business. This is a policy which our association has advocated and which we propose to hold constantly before our members.

We are in a business which requires no small amount of ability. We believe that the average Hardwareman is a little bit more intelligent than his fellow merchant in other lines of business.

THE HARDWAREMAN MUST BE DILIGENT.

He is compelled to have his store open to meet the mechanic and supply his demands for tools before the hour of labor in the morning. He must be prepared to meet the housewife who finds during the day that she needs some Household or Cooking Utensils. And in the evening he must be prepared to again meet the mechanic, who has ascertained that some of the tools with which he started to work in the morning need renewal. Indeed the Hardwareman above all others must be diligent in his business. We think that he who said, "Seest thou a man diligent in business, he shall stand before kings," must have had in mind the Hardware merchant. He it is indeed who should stand before kings and he has little time for anything else, while those who are engaged in other lines may have time to sit behind kings, queens and jacks.

I want again to assure you of the great pleasure it has given me to meet you and to state that it will always be the pleasure of the National Hardware Association of the United States to co-operate with the retail merchants of the country, who are their friends and customers and upon whom they must rely for support.

I sincerely hope that the time will never come when there shall be any divergence of our paths, but as each organization grows in strength may we find our paths coming closer and closer together.

M. W. Callaghan's Address.

M. W. Callaghan, Reed City, spoke extempore on "What It All Means." Mr. Callaghan pointed out that if the Hardware merchant is faithful to the loyal manufacturer, the legitimate jobber and the country newspaper he will do more for himself than by following any other line of policy.

Greetings from Manufacturers' Association.

W. H. Bennett, Chicago, representing the American Hardware Manufacturers' Association, conveyed fraternal greetings from that organization, and spoke in part as follows:

Although a large part of our product finds a consuming market through the channels of the jobber, yet we recognize that the retailer is an important factor whose influence and co-operation are of value to us. He it is who displays the wares, explains their use and praises their merits to the actual user, whose verdict reflects favorably or otherwise.

The manufacturer is willing at all times to help the retailer, and the American Hardware Manufacturers' Association is ready to do everything in its power to create and bring about pleasant relations between the manufacturer and retailer. The manufacturer of standard brands of goods expends money and devotes his time to demonstrating his wares and creating a demand for them, and the jobber and retailer should be awake to do their part to distribute these wares and thereby make a profit—they should be loyal to the manufacturer of goods who has been loyal to them.

BY AN INTERCHANGE OF VIEWS AND CONCERT OF ACTION you have done much to correct evils and to minimize competition, as well as to improve conditions generally, and not only for your own individual members, but for the trade at large. Furthermore, you have doubtless learned that an enlarged acquaintanceship among others in your line of work, and a free interchange of views on questions pertaining to the competition, bring both pleasure and profit.

Competitors in business generally misunderstand each other, and nearly always each is ready to attribute unholy motives to the other fellow without thoughtful consideration or investigation of any kind.

Thoughtful people must know that a merchant cannot sell goods at cost, except such merchandise as shop-worn articles, passé styles and finishes and goods purchased under abnormal conditions from overloaded factories and the like. Storekeepers are closer to the people than any

other class of men and they run their stores to meet the requirements of their customers; in other words, they are what their customers force them to be.

PEOPLE WHO COMPLAIN OF SHODDY GOODS

which they buy generally want cheap goods, or live in a community where the demand is greater for cheap goods than it is for goods of a substantial character.

The man who thinks a home merchant is trying to cheat him may be unwilling to pay a fair profit on his purchases, and therefore courts the treatment of which he complains. He generally is the man who assumes to know what goods cost, and goes from one store to another until he gets the kind of a price he wants. Then in the end, if he finds he has to pay for unaccounted extras, he says with a loud voice that he has been cheated.

IT IS NEVER GOOD FOR THE MERCHANT

or the people when staple goods are sold below the staple price at which such goods are sold the country over. Honest, fair competition really is not competition at all—but legitimate business. The great trouble is that we have come to misunderstand the word competition, and confuse it with throat cutting. Competition has become throat cutting, and that is not the life but death of trade. Price agreements—if not carried to criminal ends—are legitimate and fair to all.

MANUFACTURER TO RETAILER.

Originally the producer was the vender of his own product. The first necessity, as the demand for goods increased, was the retailer, and the last necessity the wholesaler. While the retail business was done by many small dealers the position of the wholesaler was an important one, really indispensable; but as the population increased and prosperous retailers adopted methods to attract trade to fewer centers the retailers became able to handle greater and greater quantities of goods, until many of them became larger purchasers than the wholesale dealers themselves, and consequently more desirable customers of the producers. In some branches of business, such as boot and shoe, grocery and dry goods, this has taken place to such an extent that the wholesaler now most decidedly has taken second place to many retailers in the amount of goods handled. The immense quantity of goods that now pass direct from the producer to the retailer once passed first through the hands of the wholesaler.

So far as I can see, this difference is to be greater in the future; the larger a retail business the more direct dealings with first hands and the less use for the middleman. Also, where the needs of the retailer are too small to warrant buying at first hand, the combination of a number of smaller dealers who are not in competition with each other enables them to obtain the advantages of large buyers by purchasing together and dividing their purchases according to their needs. Hence the numerous syndicates.

An invitation to be present during the deliberations of the Illinois Retail Hardware Association in Chicago next February, a prominent feature of which will be a Hardware show in the Coliseum, was extended by G. R. Lott of that city.

Deliberations closed with an executive session on Thursday afternoon, which was devoted to the consideration of committee reports and the discussion of problems propounded in the "Question Box."

Everyday Paint.

A paper entitled "Everyday Paint," written by C. B. Heckel, secretary of the Paint Grinders' Association of America, was read by F. R. Dougall of the Acme White Lead & Color Works, Detroit, at the opening of the afternoon meeting. This paper, in view of the increasing attention which Hardwaremen are giving to Paints, was listened to with much interest, and will be published in a later issue.

Resolutions Adopted.

The report of the Committee on Resolutions, which was unanimously adopted, follows:

Whereas, The members of this association as merchants have been frequently compelled to suffer inconvenience and loss through delayed shipments of freight without an opportunity of securing redress from the railroads, and as it is generally admitted that all classes of freight could be moved a greater average number of miles per day, than has been customary in the past; therefore, be it

Resolved, That this association place itself on record as favorable to the enactment by Congress of an act to empower the Interstate Commerce Commission to issue a rule governing all railroads which will require a time limit on all interstate shipments conforming to the length of the haul, and that the railroads be compelled to remunerate the consignee by reducing

the freight bill a reasonable percentage for each 24 hours' delay beyond the daily movement prescribed by the commission.

Resolved, That the Committee on Legislation be and is hereby instructed to use every means possible to have the Michigan State Legislature enact a law prohibiting the sale of Mixed Paint or White Lead without the formula printed on the package.

Whereas, It has come to our knowledge that suits for damages have been entered against our National officers and that the defense of these suits involves expense; therefore, be it

Resolved, That we stand by our National officers and pledge ourselves to meet our proportion of the necessary expense in the defense of these suits, and that the Executive Committee is hereby authorized to appropriate out of the funds of the association a sum of \$500 for that purpose, or more if necessary.

Whereas, There has been an attempt to create a demand for what is known as the Post Check Currency bill, which would have a tendency to encourage sending money through the mail; and,

Whereas, The growth of the mail order idea is sure to eventually work injury upon the retail merchants of the country,

Resolved, That the association is unalterably opposed to the Post Check Currency bill and the Parcels Post bill or any legislation having a similar object; and it is further

Resolved, That a copy of this resolution be forwarded to the Postmaster-General and members of Congress from this State, and we hereby endorse the bill providing for one-cent postage on first-class matter.

Resolved, That we appreciate the zeal displayed by manufacturers and jobbers in making their displays and the universal courtesy extended by them and their representatives in charge. We also thank Mayor George P. Codd for his kindly greeting and welcome, not forgetting the trade papers for their unlimited space and help freely given to make the convention a success.

Resolved, That this convention give its unqualified endorsement to the National Association and its officers on all actions taken during the past year, and the association pledges its loyal support in the future.

Resolved, That we extend to the visiting officers our thanks and appreciation of their presence at this convention.

Resolved, That the secretary be instructed to draw up a suitable memorial to be inscribed on our records in commemoration of the following members who passed away during the past year: T. Frank Ireland, ex-president, Belding; C. H. Loomis, Sparta; Frank H. Wickey, Detroit; W. P. Culver, Portland; R. E. Baetcke, Brighton; Josiah Thompson, Owosso; L. B. Brockett, Battle Creek; A. H. Wallace, Algonac; Nolan Bruce and H. W. Harding, Ypsilanti.

Election of Officers.

The following officers were elected for the ensuing year:

PRESIDENT, E. B. Standart, Holland.

VICE-PRESIDENT, Charles M. Alden, Grand Rapids.

SECRETARY, A. J. Scott, Marine City.

TREASURER, Henry C. Weber, Detroit.

MEMBERS OF THE EXECUTIVE COMMITTEE to serve two years: J. H. Whitney, Merrill; J. G. Patterson, Detroit; F. M. Brockett, Battle Creek; E. S. Roe, Buchanan. To fill vacancies on this committee to serve one year: P. A. Wright, Holly; M. A. Benson, Saranac.

The president and secretary, together with four delegates that the former has been empowered to appoint, will represent the association at the convention of the National organization to be held in Boston in March, 1907.

CONVENTION NOTES.

The entertainment features were on an elaborate scale, and included a visit to Electric Park on Thursday night, as guests of the association and a boat ride and supper at Bois Blanc Park Friday afternoon and evening. The steamer *Pleasure*, with nearly 1000 on board, cast off her lines from the foot of Woodward avenue at 2 o'clock, and the trip up the Detroit River gave the visitors an opportunity of viewing the many plants of the diversified manufacturing interests which dot the American shore. A vaudeville performance was given en route in the main saloon. An excellent supper was served at the Bois Blanc café, located on the island of that name.

The Reception Committee of Detroit Hardware manufacturers, jobbers and retailers on the trip was made up as follows: J. M. Anderson, J. Frank Boydell, James Brown, W. J. Burton, F. H. Conant, W. T. Collard, D. T. Crowley, H. J. Dobson, Edgar Elliott, Edward Frohlich, J. H. Hatt, W. F. Heming, Albert Kern, Fred. Mason, George H. Hill, W. L. Hill, C. A. Kaichen, J. F. Monaghan, M. J. Reilly, R. E. Rogers, J. M. Thurber, P. S. Weeks, J. A. Whiting, W. B. Wood and L. B. Young.

The admission of salesmen and manufacturers affiliated with the Hardware trade to honorary membership

upon the payment of a nominal fee of \$1 is a feature that has been adopted by the Michigan Association. This enrollment during the meeting numbered over 200.

Representation from the National Association and other affiliated trade organizations was unusually heavy, and included W. H. Bennett, Chicago, representing the American Hardware Manufacturers' Association; T. James Fernley, Philadelphia, secretary of the National Hardware Association; W. P. Bogardus, Mount Vernon, Ohio, and E. M. Bush, Evansville, Ind., the former chief executive and the present incumbent of that office of the National Retail Hardware Association; H. L. McNamara, Janesville, Wis., and G. R. Lott, Chicago, members of the Executive Committee of the National Retail Hardware Association, and C. A. Peck, Berlin, Wis., secretary of the Wisconsin Retail Hardware Association.

An unusually large and handsome display of Builders' Hardware, in charge of E. C. Waldvogel, was made by the Yale & Towne Mfg. Company, New York. The cases, four in number, have been especially designed for exhibition purposes, and are provided with drawers in which the goods are packed for shipment. They are electrically illuminated from the interior, and these electric fixtures are permanent, thus obviating the usual difficulty experienced in having the wiring done at the different show places.

Doe-Wah-Jack, in full Indian regalia, distributed "Round Oak" souvenirs for the Estate of P. D. Beckwith, Dowagiac, Mich. The dispensation of hospitality was in charge of J. O. Becroft, W. T. Leckie and J. G. Stiff, the genial representatives of this well-known Stove concern.

At the joint exhibit of the Robeson Cutlery Company and the Rochester Stamping Company, Rochester, N. Y., the latest window displays of these two concerns were shown and attracted considerable attention. The equipment of the "Rochester" fancy ware display consists of male and female cardboard figures, table leg and top with dolly and six pedestals with square cardboard tops. The table is to be placed in the center of the window, with Chafing Dish, Tray and accessories resting on the dolly and the figures are placed at either side of the table. Other ware is placed on the pedestals and accessories can be tastefully arranged in the window between them. The "Shuredge" Carver window display of the Robeson Cutlery Company consists of a large lithographed turkey, which is either nailed to the background of the window or suspended from the ceiling at its center. Fourteen streamers of crepe paper are extended from the turkey to a like number of Carver sets, arranged in a semi-circle in the window front. Small lithographed turkey cuts are also provided for framing the entire display.

EXHIBITS.

Elaborate displays, replete with new lines, were made by manufacturers and jobbers, the assembly room on the main floor and the parlor floor of the Cadillac having been devoted almost entirely to exhibits. Forty-five concerns were represented, and more would have shown their goods provided the space could have been secured. Owing to limited accommodations afforded this feature even by the largest hotels, some of the members of the association expressed themselves in favor of renting a large hall in Detroit, where next year's convention will be held, which will provide ample room for all the exhibits and where they may be gathered on one floor. Nothing definite, however, has been decided, and action rests in the hands of the Executive Committee. Boutonnieres of roses, carnations and asters were freely distributed, and several of the jobbers entertained their visitors with vocal and piano selections. Useful souvenirs, both handsome and costly, were also given out, and all previous efforts in this direction at late conventions were surpassed. The convention also proved a profitable one to the manufac-

turers, as many orders were booked not only for new staple lines, but the specialties shown as well. A list of the exhibitors follows:

AMERICAN STEEL & WIRE COMPANY, Chicago: Field fencing. Represented by W. H. Crawford and S. E. Olcott.

ASPHALT ROOFING COMPANY, Saginaw, W. S., Mich.: Welugas Asphalt Roofing, Tarred Felt and Roofing Materials. Represented by W. H. Tausend, C. H. Morford and G. A. Sigler. Souvenir, memorandum book.

E. C. ATKINS & Co., Indianapolis, Ind.: Saws. Represented by W. E. Stalnaker and Robert Eveland. Souvenir, aluminum cigar case.

ATLANTIC STAMPING COMPANY, Rochester, N. Y.: Galvanized and Enameled Stamped Ware. Thomas F. Burton, representative.

BALDWIN STOVE COMPANY, Cleveland: Stoves, Ranges and Heaters. Represented by H. E. Watkins.

ESTATE OF P. D. BECKWITH, Dowagiac, Mich.: Stoves, Ranges and Furnaces. Represented by W. T. Leckie, J. O. Becraft and J. G. Stiff. Souvenir, ribbon watch fob with Round Oak charm.

BERRY BROTHERS, Detroit: Varnishes. Represented by Frank McCall. Souvenir, lithographed post card and hand mirror.

BLACKSTONE MFG. COMPANY, Jamestown, N. Y.: The Imperial Rotary Washer. Represented by D. P. Hicks.

BOSTWICK-BRAUN COMPANY, Toledo, Ohio: Represented by Howard Nusbaum, C. W. Brown, H. D. Ranney, Walter Breay, J. I. Brender and F. M. Groschner.

BOYDELL BROTHERS' WHITE LEAD & COLOR COMPANY, Detroit: Barn and Roof Paints. Represented by J. Meyer. Souvenir, watch fob.

BUHL SONS COMPANY, Detroit, Mich.: Full line of Rifles, Prepared Roofing, &c. Represented by A. H. Buhl, A. B. Jourden, C. V. Hetts, W. J. Lafrey, J. F. Putnam and C. M. Moulton. Souvenir, paper weight and stamp case.

CHAPPELL FURNACE COMPANY, Morenci, Mich.: Coal and Wood Chute and Hot Air Furnaces. Represented by J. M. Triggs.

COLUMBIAN HARDWARE COMPANY, Cleveland: Builders' Hardware. Represented by R. S. Hickey and G. W. Kinsel.

CRIBBEN & SEXTON COMPANY, Chicago: Base Heaters and Ranges; the three-flue construction of the Imperial Heater was sectionally shown and attracted much attention. Represented by W. S. Jackson and R. H. Wheeler. Souvenir, nicked match safe and memorandum book.

DETROIT REGISTER COMPANY, Detroit, Mich.: Side Wall Registers. Represented by B. H. Edwards.

DOVER MFG. COMPANY, Canal Dover, Ohio: Asbestos Sad Irons. Represented by W. D. Anderson.

ELECTRIC HEAT REGULATOR COMPANY, Minneapolis, Minn.: Heat Regulator for Furnaces, Water Heaters, &c. Represented by L. A. Norton.

FOLLANSBEE BROTHERS COMPANY, Pittsburgh: Tin Plate and Black Sheets. Represented by E. H. Rider.

FOREST CITY PAINT & VARNISH COMPANY, Cleveland, Ohio: Paints and Varnishes. Represented by R. C. Talbot, A. F. Mattison, C. A. Young and F. E. Plie. Souvenir, china plate.

FUEL ECONOMY & MFG. COMPANY, Detroit: Ruberoid Roofing and Burton's Fuel Economizer. Represented by J. M. Anderson. Souvenir, memorandum book.

HEATH & MILLIGAN MFG. COMPANY, Chicago, and the SCHROEDER PAINT & GLASS COMPANY, Detroit: Joint exhibit of Paints and Varnishes. Represented by G. L. Bouton, Fred. W. Schroeder and Fred Rinsched. Souvenir, oxidized silver cuff button.

HIBBARD, SPENCER, BARTLETT & Co., Chicago: Represented by A. L. Williams and J. G. Van Lenwen.

INDEPENDENT STOVE COMPANY, Detroit: Renown Stoves and Ranges. Represented by Robert J. Waddell.

JOLIET STOVE WORKS, Joliet, Ill.: Moore's Stoves and Ranges. Souvenir, wall match safes.

LEHON COMPANY, Chicago: Roofing, Waterproofing, Paints, Electrical Varnish and Tape. Represented by W. D. Cleland and A. H. Claxton.

LOWE BROTHERS COMPANY, Dayton, Ohio: Full line of Paints. Represented by C. S. Kennedy, F. O. Downer and E. K. Springer. Souvenir, watch fob and button.

MICHIGAN STOVE COMPANY, Detroit, Mich.: Garland Stoves and Ranges. Represented by O. E. Jennings, F. K. Learned, G. J. Baker. Souvenir, russet leather cigar case.

OBER MFG. COMPANY, Chagrin Falls, Ohio: Patent Solid Sad Iron. Represented by A. J. Shute and A. M. Ober. Souvenir, toy iron.

ONE-MINUTE WASHER COMPANY, Sandusky, Ohio: Washing Machines. Represented by H. Mendenhall.

PIKE MFG. COMPANY, Pike, N. H.: Oil Stones, Scythe Stones, Razor Hones, Cornum and Emery Wheels. Represented by J. A. Winters and R. J. Horton. Souvenir, pen knife oil stone, inclosed in an embossed silver plated box.

PITTSBURGH PLATE GLASS COMPANY, Detroit branch: Full line of Patton's Sun Proof Paints. Represented by W. F. Ernst and W. T. Collard. Souvenir, miniature paint bucket savings bank.

PITTSBURGH STEEL COMPANY, Pittsburgh: Electric Weld Field Fencing. Represented by F. A. Gower, J. A. Roberts, E. Steytler. Souvenir, steel canes.

T. C. PROUTY COMPANY, Limited, Albion, Mich.: All Steel Door Hangers. Represented by Mark Merriman.

REED MFG. COMPANY, Newark, N. Y.: Anti-Trust Tinware, Flintstone Enameled Ware, Galvanized Stamped Ware. Represented by J. R. Sackett.

REPUBLIC METALWARE COMPANY, Buffalo: Full line of Stamped Enameled Ware. Represented by E. J. Watson and J. A. Pratt. Souvenir, celluloid rule and aluminum letter opener.

ROBESON CUTLERY COMPANY, Rochester, N. Y.: Complete line of Pocket and Table Cutlery. Represented by E. C. Gale and H. M. Rogers.

ROCHESTER STAMPING COMPANY, Rochester, N. Y.: Complete line of Nickel, Tin, Galvanized Brass and Copper Stamped Ware. Represented by E. C. Gale and H. M. Rogers.

SILL STOVE WORKS, Rochester, N. Y.: Sterling line of Stoves and Ranges. Represented by B. M. and E. B. Ross.

STANDART-SIMMONS HARDWARE COMPANY, Toledo, Ohio: Line of Keen Kutter Tools. Represented by C. B. Bennett, C. A. Fitzgerald, Fred. R. Russell, A. L. Peck, E. C. Weeber, W. H. Standart and F. E. Moulton.

STOWELL MFG. & FLY. COMPANY, Milwaukee, Wis.: Barn Door Hangers. Represented by W. L. Bigelow. Souvenirs, pen wipers, book marks and celluloid letter openers.

UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn.: Loaded shells. Represented by John G. Cole, Jr.

WAHLE FOUNDRY & MACHINE WORKS, Davenport, Iowa: Snowball Washing Machines. Represented by H. H. Wahle and Geo. Matern. Souvenir, baseball.

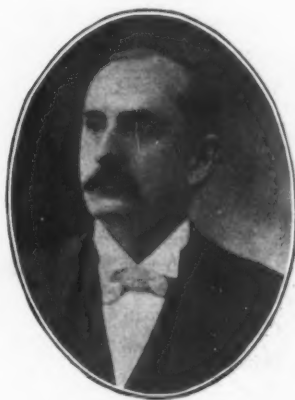
WHITE LILY WASHER COMPANY, Toledo, Ohio, and Davenport, Iowa: White Rose Washing Machine. Represented by Sam T. White and A. F. Victor. Souvenir, memorandum book.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn.: Winchester Guns, Loaded Shells and Metallic Cartridges. Represented by F. S. Foster. Souvenir, handsome gun metal pocket match safe.

YALE & TOWNE MFG. COMPANY, New York: Builders' Hardware, Padlocks, Cabinet Locks. Represented by E. C. Waldvogel. Souvenir, paper knife.

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Smith & Glass.	BERRIEN SPRINGS.
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McGraw & Crone.

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Fred. Hafelt.

R. L. Schell & Co.

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H. Godfrey & Son.

Spencer Hardware Co.

KINGSLEY.
Henry Hainstock.

KINGSTON.
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Grout & Darling.

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Wm. DeKruif & Co.

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LITCHFIELD.
R. J. Shattuck & Co.

LOWELL.
Scott & Winnegar.

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D. J. Goodsell.

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Hatch & Baker.

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Wm. Miller.

O. Rosenfield.

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Fred. Widmayer.

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St. Louis Hardware Co.

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Guthard & Schoen.

E. M. Henne.

SAGINAW.
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Clark Hardware Co.

John Doerr.

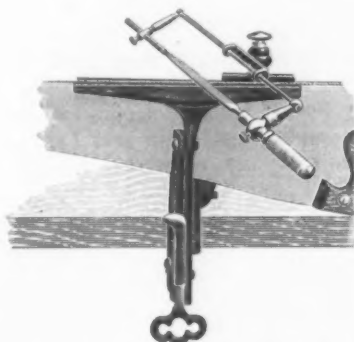
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tannia metal covers. They are made in both tin and enamel ware, and in a short time will also be offered in nickel. A feature of the knobs is that they are hollow and are spun upon the surface of the cover without any opening through which steam could be admitted. Thus the knob contains an air chamber which, it is explained, heats slowly and makes the knob comparatively cool.

The Foote Saw Filing Guide.

The J. B. Foote Foundry Company, Frederickstown, Ohio, is offering the saw filing guide, herewith illustrated, which is attached to the company's No. 3 saw filing vise. The guide is substantially constructed, with all parts

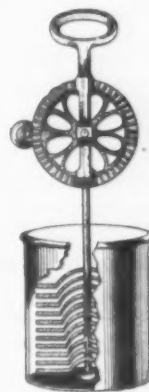


The Foote Saw Filing Guide.

made of machinery steel, including the handle and the thumb screw. The handle is adjustable, as well as the part that holds the small end of the file.

One-Minute Egg and Cream Beater.

F. W. Loll Manufacturing Company 45½ Pratt street, Meriden, Conn., is putting on the market the egg and cream beater shown herewith. It is made of malleable iron so that it will not break. The cup holds one quart.



The One-Minute Egg and Cream Beater.

The beater has 22 arms, and at a rapid speed with the arms striking the cream at the same time will, it is remarked, beat the poorest cream in one minute. The beater is also designed to whip eggs, sponge and layer cake.

The Henley Swivel Coupling.

The B. Henley Swivel Coupling Company, Edinburg, Pa., is offering the single and double tree coupling shown herewith. It has a perfectly free motion while being a solid coupling, and there is nothing about it that can work loose. The two plates are made of malleable iron, and the clip is forged from one piece of soft steel. The wear is taken up by tightening the two nuts underneath

MISCELLANEOUS NOTES.

Minimax Chemical Fire Extinguisher.

The Minimax chemical fire extinguisher, for which McClellan & Gotwalt Company, 41 East Market street, York, Pa., is representative for the United States and Canada, is conical in shape and can be operated with one hand. A protruding knob in the bottom is hit against the wall or floor when there is occasion to use the extinguisher. It weighs 18 lb. when filled, and can be re-filled after it is used. Among the points of excellence mentioned are the following: That reversing is unnecessary; that there is no evaporation; that it is always ready for use; that there is no hose or mechanism about it, and that it never fails. It is stated that the device extinguishes all fires, including burning motor cars, fires of tar, varnish, turpentine, cotton, wool, &c.

E-Z-Black Stove Polish.

Cochecho Specialty Company, Farmington, N. H., has put on the market the E-Z-Black stove polish. It is referred to as giving a lasting jet black gloss that will not rub off, as having no odor and making no dust, as noninflammable, containing no acid, as safe to use and easy to apply.

Hollow Knob Cover.

Central Stamping Company, 24 Cliff street, New York, is now offering Tea and Coffee Pots with covers having



Hollow Knob Cover.

hollow metal knobs, as shown in the accompanying illustration. In appearance they are similar to silver or Bri-

the shaft bar of the swivel clip. The coupling requires no leathers on trees and shaft bar, and there is no rattle.

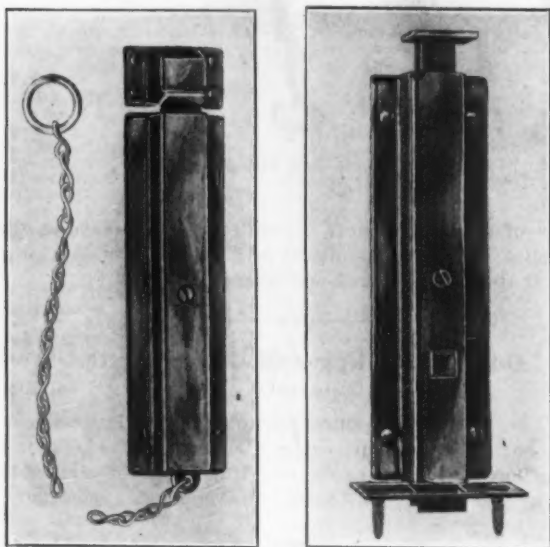


The Henley Swivel Coupling.

The couplings are furnished with single tree or double trees attached, painted in any color or in the white; or the couplings may be obtained separately.

Stamped Steel Chain and Foot Bolts.

The Shelby Spring Hinge Company, Shelby, Ohio, is offering the stamped steel chain and foot bolts shown in the accompanying cuts. They are not only neat and



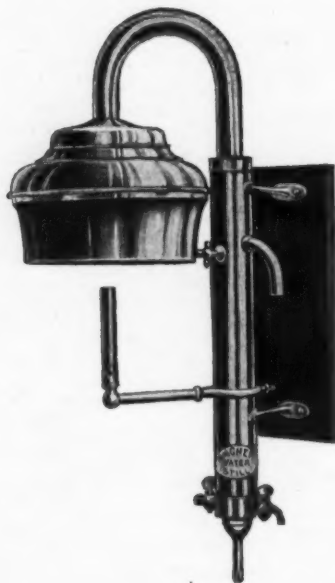
Stamped Steel Chain and Foot Bolts.

light, but are practically unbreakable and take on a much better finish than cast goods. They are packed $\frac{1}{2}$ doz. in a box and furnished in all the regular hardware finishes.

Wagner Automatic Water Still.

The Wagner Water Still Company, 87-89 Washington street, Chicago, is offering an automatic water still for furnishing pure drinking water, as shown in the accompanying illustration. The stills are made in a variety of capacities from $\frac{1}{2}$ gal. to 2 gal. per hour, operated by gas, and from 100 to 1000 gal. daily when operated by steam. The smaller stills are made of copper, nickel plated, so that they present an attractive appearance in the apartment. They are designed to be attached to the wall in some convenient place about 6 ft. above the floor, and preferably over a sink or where provision for the overflow and drainage can be readily made. The still consists of a water still or boiler and a condenser. The gas connection to the Bunsen burner is made through the arm supporting the burner. The water supply is connected with the threaded cock at the left and base of the condenser. In operation the water supply is turned on and regulated to the desired amount and then the gas is turned on and lighted. The construction provides for a continuous inflow of water, and when it rises above the proper level in the boiler the curved tube in the condensing chamber just above the bottom of the boiler permits the surplus supply to run off without interfering with the distilling process. This construction automatically con-

trols the amount of water contained in the boiler, so that the distillation of pure water continues unaffected by the inflow of water to keep up the supply. As the water is evaporated in the boiler the supply is renewed as required. The smaller cock at the right and base of the condenser is used for draining purposes. The distilled water drops from the nozzle in the center of the



Wagner Automatic Water Still.

condenser at the base, it only being necessary to provide a receptacle into which this water can continually drop. By this means the water is pure and aerated, so that it is agreeable for drinking purposes. The construction provides for the detachment of the boiling chamber so that all parts can be thoroughly cleaned, and they can be taken apart without the use of tools.

The Jones Improved Side Wall Registers.

The accompanying cuts illustrate side wall registers with pressed steel fronts, manufactured by the United States Register Company, Battle Creek, Mich. In addition to those shown, registers are made for second floor; for heating two rooms, second floor; for heating two rooms, first floor; also convex wall registers. They have an



Fig. 1.—Jones Register A No. 15, for First Floor Rooms.

adjustable deflector, or damper, to cause the air as it enters the room to leave the register at an angle of 45 degrees, and provision is also made to prevent air from the cellar or coal room entering the living or sleeping rooms. Some of the registers are so arranged that two rooms on the first floor and one room on the second floor

are heated from one large basement pipe, or one room can be heated on the first and one room on the second

tween the inner and outer casing and a ventilating opening, where air is drawn out of the rooms being heated and may be conducted through the air space around the



Fig. 2.—Jones Register A No. 14, for First Floor Rooms.



Fig. 3.—Back View of Register Front.

floor from one basement pipe. The ventilating air space in the registers is designed to secure ventilation in all rooms. The registers are provided with an air space be-

wall pipe if single wall pipes are used, or through the space between the two casings of a double wall pipe when the latter is used.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		Miscellaneous—		Blue, Ultramarine.....		Black, Ivory.....	
Linsced, City, raw.....	38 @39	Barytes: White, Foreign.....	17.50@19.00	Brown, Vandyke.....	11 @14	Lamp, Com.....	4 1/2 @ 6
City, Boiled.....	39 @40	Amer. floated.....	19.00@	Green, Chrome.....	12 @15	Blue, Celestial.....	4 @ 6
State and Western, raw.....	37 @38	Off color, No. 2.....	13.50@15.00	Green, Paris.....	12 @15	Blue, Chinese.....	29 @32
Raw Calcutta Seed.....	68 @71	Chalk, in bulk.....	3.00@3.25	Sienna, Raw.....	12 @15	Blue, Prussian.....	27 @30
Lard, Extra Prime, Winter.....	46 @47	In bbls.....	100 @ 35	Sienna, Burnt.....	12 @15	Blue, Ultramarine.....	4 1/2 @15
Extra No. 1.....	47 @48	China Clay, English.....	11.00@17.00	Umber, Raw.....	11 @14	Brown, Spanish.....	1/2 @ 1
No. 1.....	40 @44	Cobalt, Oxide.....	100 @ 2.50	Umber, Burnt.....	11 @14	Carmine, No. 40.....	3.10@3.20
Cotton-seed, Crude, f.o.b. mills.....	38 1/2 @39 1/2	Whiting, Common.....	100 @ .50			Green, Chrome, ordinary.....	3 1/2 @ 6
Summer Yellow, Prime.....	38 1/2 @39 1/2	Gilders.....	100 @ .55	White Lead, Zinc, &c.—		Green, Chrome, pure.....	17 @25
Summer Yellow, off grades.....	38 @39	Ex. Gilders.....	100 @ .55	Lead, English white, in Oil.....		Lead, Red, bbls., 1/2 bbls. and kegs:	
Sperm, Crude.....	53 @55			Lead, American white, in Oil:		Lots 500 lb or over.....	7 1/2 @ 7 1/2
Natural Spring.....	53 @55	Putty, Commercial—		Lots less than 500 lb.....		Lots less than 500 lb.....	7 1/2 @ 7 1/2
Bleached Spring.....	53 @55	In bladders.....	1.70 @1.85	Lead, White, in oil, 25 lb tin		Litharge, American, bbls.....	7 1/2 @ 7 1/2
Natural Winter.....	53 @55	In bbls. or tubs.....	1.20 @1.40	pails, add to keg price.....		Ocher, American.....	8.50@16.00
Bleached Winter.....	53 @55	In 1 lb to 5 lb cans.....	2.65 @2.95	Lead, White, in oil, 12 1/2 lb tin		American Golden.....	2 1/2 @ 3 1/2
Bleached Winter, Extra.....	53 @55	In 12 1/2 to 50 lb cans.....	1.50 @1.90	pails, add to keg price.....		French.....	1 1/2 @ 2 1/2
Tallow, Prime.....	51 @53	Spirits Turpentine—		Lead, White, in oil, 1 to 5 lb		Foreign Golden.....	3 @ 4
Whale, Crude.....	32 @33	In Oil bbls.....	63 @64	ass'ted tins, add to keg price.....		Orange Mineral, English.....	10 @12
Natural Winter.....	43 @44	In machine bbls.....	64 @64 1/2	Lead, American, Terms: For lots 12		French.....	10 @12
Bleached Winter.....	43 @44	Glue—		tons and over 1/4 % rebate; and 2% for		German.....	8 1/2 @10
Extra Bleached Winter.....	43 @44	Cabinet.....	11 @15	cash if paid in 15 days from date of		American.....	8 1/2 @10
Menhaden, Brown, Strained.....	28 @29	Common Bone.....	7 @ 9	invoice; for lots of 500 lbs. and over		Red, Indian, English.....	4 1/2 @ 8 1/2
Light, Strained.....	27 @30	Extra White.....	19 @24	2% for cash if paid in 15 days from		American.....	3 @ 3 1/2
Bleached, Winter.....	27 @30	Foot Stock, White.....	11 @14	date of invoice, for lots of less than		Red, Turkey, English.....	4 @10
Extra Bleached, Winter.....	27 @30	Foot Stock, Brown.....	8 @11	500 lbs. net.....		Red, Tuscan, English.....	7 @10
Southern.....	27 @30	German Hide.....	12 @18	Lead, White, Dry, in bbls.....		Red, Venetian, Amer.....	100 @ \$0.50 @1.25
Cocoonut, Ceylon.....	7 1/2 @ 7 1/2	French.....	10 @40	Zinc, American, dry.....		English.....	100 @ \$1.15 @1.75
Cochin.....	8 1/2 @ 8 1/2	Irish.....	13 @16	Zinc, French:		Sienna, Italian, Burnt and	
Cod, Domestic, Prime.....	30 @33	Low Grade.....	9 @12	Antwerp, Red Seal, dry.....		Powdered.....	3 @ 9 1/2
Newfoundland.....	37 @42	Medium White.....	14 @17	Antwerp, Green Seal, dry.....		Italian, Raw, Powdered.....	3 @ 6 1/2
Red, Elaine.....	37 @42	Gum Shellac—		Paris, Red Seal, dry.....		American, Raw, Powdered.....	1 1/2 @ 2
Red, Saponified.....	4 @ 5	Bleached Commercial.....	45 @47	Paris, Green Seal, dry.....		American Burnt and Pow.....	1 1/2 @ 2
Olive, Italian, bbls.....	52 @56	Bone Dried.....	55 @57	Zinc, V. M. French, in Poppy Oil:		Talc, French.....	17.00@25.00
Neatsfoot, Prime.....	48 @49	Button.....	50 @50	Green Seal:		American.....	17.00@25.00
Palm, Logos.....	6 1/2 @6 1/2	Diamond I.....	54 @55	Lots of 1 ton and over.....		Terra Alba, French.....	100 @ 80 @1.00
Mineral Oils—		Fine Orange.....	50 @52	Lots of less than 1 ton.....		English.....	100 @ 80 @1.00
Black, 28 gravity, 25@30 cold test.....	10 1/2 @11 1/2	A. C. Garnet.....	40 @40	Zinc, V. M. French, in Poppy Oil:		American.....	100 @ 80 @1.00
29 gravity, 15 cold test.....	11 1/2 @12 1/2	D. C.....	58 @60	Red Seal:		Umber, Tkey, Bot. & Pow.....	2 1/2 @ 3 1/2
Summer.....	10 1/2 @11 1/2	Octagon B.....	52 @52	Lots of 1 ton and over.....		Turkey, Raw and Powdered.....	1 1/2 @ 2
Cylinder, light filtered.....	18 @19	T. N.....	47 @49	Lots of less than 1 ton.....		Raw, American.....	1 1/2 @ 2
Dark filtered.....	16 @17	V. S. O.....	55 @55	Discounts—French Zinc—Discounts		Yellow Chrome.....	12 @15
Paraffine, 903-907 gravity.....	13 1/2 @14	Colors in Oil—		to buyers of 10 bbl. lots of one or mixed		Vermilion, American Lead.....	10 @25
903 gravity.....	13 1/2 @13	Black, Lampblack.....	12 @14	grades, 1%; 25 bbls., 2%; 50 bbls., 4%.		Quicksilver, bulk.....	65 @
883 gravity.....	10 1/2 @10 1/2	Blue, Chinese.....	36 @46	Dry Colors—		Quicksilver, bags.....	66 @
Red.....	12 1/2 @14	Blue, Prussian.....	32 @36	Black, Carbon.....		English, Import.....	65 @70
In small lots 1/2 % advance.				Black Drop, American.....		Chinese.....	\$0.90 @1.00
				Black Drop, English.....			

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Subscription, postpaid, \$5.00 a year

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General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

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Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ lb. 6¢ @ 7¢
Hay-Budden, Wrought.....9¢ @ 9½¢
Trenton..... $\frac{1}{2}$ lb. 9¢ @ 9½¢

Imported—

Peter Wright & Sons, $\frac{1}{2}$ lb. 84 to 340 lb. 11¢; 350 to 600 lb. 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15¢ @ 10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur.....75¢ @ 75¢
Jennings' Patm., reg. finish.....50¢ @ 100%

Black Lip or Blud—

.....60¢ @ 100%

Boring Mach. Augers—

Car Bits, 12-in. twist.....50¢ @ 100%

Ford's Auger and Bits—

.....40¢ @ 100%

Forster Pat. Auger Bits—

.....25¢ @ 100%

C. E. Jennings & Co.—

No. 10 ext. lip. R. Jennings' list. 25¢
No. 30, R. Jennings' list. 40¢ @ 75%

Russell Jennings—

L'Hommiedieu Car Bits.....12¢ @ 100%

Mayhew's Countersink Bits—

.....50¢ @ 100%

Millers Falls—

Pugh's Black.....20¢ @ 100%

Pugh's Jennings' Pattern—

.....35¢ @ 100%

Snell's Auger Bits—

.....60¢ @ 100%

Snell's Bell Hangers Bits—

.....60¢ @ 100%

Snell's Car Bits, 12-in. twist—

.....60¢ @ 100%

Wright's Jennings' Bits—

.....50¢ @ 100%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, 18; large, 32.....50¢ @ 100%

Clark's Pattern, No. 1, $\frac{1}{2}$ doz. 25¢
No. 2, 18.....65¢ @ 100%

Ford's, Clark's Pattern.....60¢ @ 100%

C. E. Jennings & Co., Steer's Pat. 25¢
Swan's.....60¢ @ 100%

Gimlet Bits—

Common Dble. Out.....\$3.00 @ 3.25

German Pattern, Nos. 1 to 10,
\$4.60; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.50 @ 6.00

Ames.....25¢ @ 100%

Universal.....20¢ @ 100%

Wood's Universal.....25¢ @ 100%

Ship Augers and Bits—

Ship Augers.....45¢ @ 50¢

Ford's.....35¢ @ 100%

C. E. Jennings & Co.:
L'Hommiedieu's.....15¢ @ 100%

Watrous'.....35¢ @ 100%

Snell's.....40¢ @ 100%

Awl Hfts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:

Handled.....gro. \$2.75 @ 3.00

Unhlded, Shldered.....gro. 65¢ @ 70¢

Unhlded, Patent.....gro. 65¢ @ 70¢

Peg Awls:

Unhlded, Patent.....gro. 31¢ @ 34¢

Unhlded, Shldered.....gro. 65¢ @ 70¢

Scratch Awls:

Handled, Com.....gro. \$3.50 @ 4.00

Handled, Socket.....gro. \$11.50 @ 12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

See Grease, Axle

Axes—

Concord, Loose Collar.....\$4.40 @ 4.50

Concord, Solid Collar.....\$4.40 @ 4.50

No. 1 Common, Loose.....34¢ @ 35¢

No. 1½ Com., New Styles.....\$4.40 @ 4.50

No. 2 Solid Collar.....\$4.40 @ 4.50

Half Patent:

Nos. 7, 8, 11 and 12.....75¢ @ 75¢

Nos. 13 to 14.....70¢ @ 70¢

Nos. 15 to 18.....75¢ @ 75¢

Nos. 19 to 22.....75¢ @ 75¢

Boxes, Axle—

Common and Concord, not turned

lb., 14¢ @ 15¢

Common and Concord, turned,

lb., 5¢ @ 6¢

Half Patent.....10¢ @ 10¢

Bait— Fishing—

Hendryx:

A Bait.....20¢

B Bait.....25¢

Competitor Bait.....20¢ @ 25¢

Balances— Sash—

Caldwell new list.....50¢

Pullman.....50¢ @ 60¢

Spring—

Spring Balances.....50¢ @ 60¢

Chatillon's:

Light Spg. Balances.....50¢ @ 100%

Straight Balances.....40¢ @ 50¢

Circular Balances.....50¢ @ 100%

Large Dial.....30¢

Barb Wire—See Wire, Barb.

Bars— Crow—

Steel Crowbars, 10 to 40 lb.,
per lb., 3¼¢

Towel—

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ gro. \$5.50

Beams, Scale—

Scale Beams.....40¢ @ 50¢

Chatillon's No. 1.....30¢

Chatillon's No. 2.....40¢

Beaters, Carpet—

Holt-Lyon Co.:

No. 12 Wire Coppered $\frac{1}{2}$ doz. \$0.85;

Tinned.....\$1.00

No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.10;

Tinned.....\$1.20

No. 10 Wire Galvanized.....\$1.25

Western W. G. Co.:

No. 1 Electric..... $\frac{1}{2}$ gro. \$7.80

No. 2 Buffalo..... $\frac{1}{2}$ gro. \$9.00

No. 3 Perfection Dust..... $\frac{1}{2}$ gro. \$8.00

Egg—

Holt-Lyon Co.:

Holt, per doz., No. 1, Jap'd,

\$1.20; No. 1, Tin'd, \$1.50; No.

H. Jap'd, \$2.00; No. 2, Tin'd,

\$2.25.

Lyon, Jap'd, per doz., No. 2,

\$1.25; No. 3, \$1.50.

Taplin Mfg. Co.:

Improved Dover, per gro. No. 60,

\$6.00; No. 75, \$6.50; No. 100, \$7.00;

No. 102, Tin'd, \$8.50; No. 150,

Hotel, \$15.00; No. 152, Hotel

Tin'd, \$17.00; No. 200, Tumbler,

\$8.50; No. 202, Tumbler Tin'd,

\$9.50; No. 300, Mammoth, per

doz., \$25.00.

Turner & Seymour Mfg. Co.:

T. & S. Dover.....\$6.00

Western W. G. Co., Buffalo.....\$7.00

Wonder (R. M. Co.)..... $\frac{1}{2}$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List.....

60¢ @ 100¢ @ 10¢ @ 5%

Hand—

Inch.....6 7 8 9 10

Doz.....\$4.75 5.70 6.65 7.60 8.55

Molders—

Inch.....9 10 11 12 14

Doz.....\$8.00 9.00 10.50 12.50 14.50

Bells— Cow—

Ordinary goods.....70¢ @ 75¢

High grade.....70¢ @ 100¢

Jersey.....75¢ @ 100%

Texas Star.....50¢

Door—

Abbe's Gong.....45¢

Barton Gong.....50¢

Home, R. & E. Mfg. Co.'s.....55¢ @ 100%

Trip Gong.....50¢ @ 50¢ @ 10¢ @ 5%

Yankee Gong.....55¢

Hand—

Hand Bells, Polished Brass.....60¢ @ 100%

White Metal.....80¢

Nickel Plated.....50¢ @ 60¢

Stiles.....60¢ @ 75¢

Cone's Globe Hand Bells.....33¢ @ 35¢

Silver Chime.....33¢ @ 35¢

Miscellaneous—

Farm Bells.....10¢ @ 25¢

Steel Alloy Church and School

50¢ @ 100¢

American Tube & Stamping Co.
Gongs.....10%

Table Call Bells.....50¢ @ 100%

Belting— Leather—

Extra Heavy, Short Lap.....60¢ @ 65%

Regular Short Lap.....60¢ @ 65%

Standard.....70¢

Light Standard.....70¢ @ 75%

Cut Leather Lacing.....50%

Leather Lacing Slides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....

Common Standard.....70¢ @ 70¢ @ 10%

Standard.....60¢ @ 60¢ @ 10%

Extra.....60¢ @ 60¢ @ 5%

High Grade.....50¢ @ 50¢ @ 10%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%

Detroit Stoddard's Lightning Tire

Upsetters, No. 1, \$4.25; No. 2, \$7.25;

No. 3, \$10.50; No. 4, \$16.25; No. 5,

\$24.00.

Green River Tire Benders and Up-

setters.....20%

Bicycle Goods—

John S. Long's Son & Co.'s 1906 list:

Chain, Parts, Spokes.....50%

Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills,

&c.—See Augers and Bits.

Blocks— Tackle—

Common Wooden.....70¢ @ 75%

Hartz St. Tackle Blocks.....50¢ @ 50¢ @ 5%

B. & L. B. Co.:

Boston Wood Snatch, 50%; Eclipse

Steel, 75%; Hollow Steel, 50¢ @ 100%;

Star Wire Rope, 50%; Tarbox Metal

Snatch, 80%; Tarbox New Style

Steel, 50¢ @ 100%; Wire Rope Snatch,

50%.

Lane's Patent Automatic Lock and

Junior.....30%

Stowell's Novelty, Mal. Iron.....50¢ @ 100%

Stowell's Self Loading.....60%

See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40%

Paper Emb

Gaultier, Mount, 40¢; Sharp, 40¢; Perkins, Mount, 40¢; Sharp, 40¢; Perkins, Mount, 40¢; Sharp, 40¢.

Can Openers— See Openers, Can.

Cans, Milk—

Illinois Pattern.....\$1.35 1.45 2.05 each.
New York Pattern.....1.30 2.20 2.45 each.
Baltimore Pattern.....1.30 2.20 2.45 each.
Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 5 10 gal.
\$18.00 60.00 120.00 gro. net.

Caps, Percussion—

Eley's E. B.....50¢/55¢
G. D.....per M 34¢/35¢
F. L.....per M 40¢/42¢
G. E.....per M 40¢/50¢
Musket.....per M 62¢/65¢

Primers—

Borden Primers, \$2 per M.....90%
B. L. Caps (Starvant Shells)
\$2 per M.....90%
All other primers per M \$1.50.....90%

Cartridges—

Blank Cartridges:
32 U. F., \$5.50.....10.65%
38 U. F., \$7.00.....10.65%
22 cal. Rim, \$1.50.....10.65%
32 cal. Rim, \$2.75.....10.65%
B. B. Caps, Con. Ball, Sugg. \$1.90
B. B. Caps, Round Ball.....\$1.40
Central Fire.....25%
Target and Sporting Rifle.....15.65%
Primed Shells and Bullets.....15.65%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15.65%

Castors—

Bed.....70¢/70.10%
Plate.....60¢/10.60.10.65%
Philadelphia.....70¢/75.10%
Acme, Ball Bearing.....33%
Boss.....70.10%
Boss Anti-Friction.....70.10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....40%
Standard Ball Bearing.....30%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders— See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
5-16 1/4 5-16 3/4 7-16 1/2 9-16
\$3.70 5.90 4.95 4.20 4.05 3.95 5.90
6 3/4 7 1/4 1 1/4 1 1/4 to 1 1/4 inch.
\$3.85 5.70 3.65 3.80
German Coil.....60¢/10.60.10.70%

Halter—

Halter Chains.....60.45¢/60.45%
German Pattern Halter Chains,
list July 24, '97.....60.10.60.10%
Covert Mfg. Co.
Halter.....35.45%

Cow Ties— See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/4—6 3/4, Straight, with ring.....\$25.00
6 1/4—6 3/4, Straight, with ring.....\$26.00
6 1/4—6 3/4, Straight, with ring.....\$30.00
6 1/4—10 3/4, Straight, with ring.....\$25.00

NOTE—Add 2c per pair for Hooks.
Traces: add per pair for Nos. 3 and 3, 2c; No. 1, 3c; No. 4, 4c to price of Straight Link.

Eastern Standard Traces, Wag-
on Chain, &c.....60.10.60.10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60.10.60.10%
Brass.....60.10.60.10%
Safety Chain.....70.10.60.10%
Gal. Pump Chain.....10.10.60.10%
Covert Mfg. Co.
Breed, Halter, Heel, Rein, Stal-
bon.....40%
Oneida Community:
Am. Dog Leads and Kennel Chains,
40¢/40.45%
Niagara Dog Leads and Kennel
Chains.....45.60.45%
Wire Goods Co.:
Dog Chain.....70.10.60.10%
Universal Dbl. Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Copper Chain, 60.45%; Steel Chain,
60%
Pullman:
Bronze Chain, 60%; Steel Chain,
60.10%
Sash Chain Attachments, per set, 8¢
Aluminum Sash Ribbon, per 100
ft.....\$1.25¢/33.00
Sash Ribbon Attachments, per set, 8¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 40¢—
Carpenters' Red.....gro. 35¢—
Carpenters' White.....gro. 30¢—
See also Crayons.

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....64.00
Russwin.....40%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools.....30%
Farmers' Carpenters', etc., Chests,
with Tools.....20%

Machinists' and Pipe Fitters'
Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....35¢/40.10%

Chisels—

Socket Framing and Firmer
Standard List.....75¢/10.75¢/10.65%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....75%
L. & I. J. White.....30¢/24.5%
L. & I. J. White, Tanged.....24.5%

Tanged—

Tanged Firmers.....\$3 1-3¢/40%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181, 25%
Cold—

Cold Chisels, good quality.....13¢/15¢
Cold Chisels, fair quality.....11¢/12¢
Cold Chisels, ordinary.....9¢/10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat., each \$8.00.....35.45%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....25%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40.10%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%
Standard, 40.10%; Skinner Pat.,
25%; Positive Drive.....33.4%
Planer Chucks.....30%
Face Plate Jaws.....40.10%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 11, 40%; No. 21.....35%
Scroll Combination, Nos. 32 and
34.....30%
Geared Scroll, Nos. 33, 31 and 35, 35%
Independent Iron, Nos. 11 and 318, 40%
Independent Steel, No. 61.....30%
Union Car Drill, Nos. 100, 101,
103.....35%
Universal 11, 12, 16, 17, 13, 14, 15, 40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30,
40 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and
72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable Hammers.....20¢/20.45%
Carriage Makers, P., S. & W.
Co.....40.10.60%
Bees' Parallels.....33.4%
Lineman's, Utica Drop Forge & Tool
Co.....40%
Wood Workers, Hammers.....40.10%
Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel, 30 doz. \$4.05 net
Star Shank, All Steel, 30 doz. \$3.24 net
W. & C. Shank, All Steel, 30 doz.,
7 1/4 in., \$3.00; 8 in., \$3.25

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
No. Chicago Horse, each.....\$4.75
1902 Century Horse, each.....\$10.75
22nd Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear
Horse, each.....\$4.75
Stewart's Patent Sheep Shear-
ing Machine, each.....\$12.75

Clips, Axle—

Regular Styles, list July 1, '05, 80%

Cloth and Netting, Wire— See Wire, &c.

Cocks, Brass—

Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....70%
Compression Bibbs.....65.10%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.—

Ordinary Goods.....75.65¢/75.65%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Callipers, Double, 65%; Inside or
Outside.....60%
Callipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....70%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

Territory: Galvanized
Galv. Charcoal Copper.
Steel. Iron. 1 1/2, 1 3/4, 2 oz.
Eastern: 60.630% 60.62 1/2% 40.610%
Central: 70% 55.67 1/2% 40.67 1/2%
Western and Southern:
65.610% 55.62 1/2% 40.65%
So. Western
62 1/2% 50.65% 40.62 1/2%
Terms, 60 days; 8% cash 10 days. Fac-
tory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each, 2 3 4 6 8
Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal.....3 4 6 8
Iceland, ea. \$1.80 \$2.10 \$2.40 \$3.00
Gal.....2 3 4 6 8
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.90 \$3.90
Galvanized, Lined, side handles,
Gal.....2 3 4 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enameled, 25%; Agate Lined, 25%

Coopers' Tools— See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 23¢/24¢; lighter
than 3 lbs. to pair.....25¢/26¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8
to 12, 24¢; No. 7, 24 1/2¢; No. 6,
25 1/2¢.

Cable Laid Italian.....

lb., A, 18¢; B, 16¢
Common India.....lb. 10¢/10 1/2¢
Cotton Sash Cord, Twisted, 17¢/19¢
Patent Russia.....lb. 11¢
Cable Laid Russia.....lb. 15¢
India Hemp, Braided, lb. 18¢
India Hemp, Twisted, lb. 12¢/13¢
Patent India, Twisted, lb. 12¢/13¢
Annisson Cordage Co.: 30 lb. solid
Braided, Nos. 8 to 12, 30.24; No. 7,
30.24; No. 6, 30.25; 30 doz., 50 ft.,
Oriole, \$2.00; 50 ft., Columbia, \$0.55;
30 ft., Vectors, \$1.00; 50 ft., 6 Thread,
\$1.10; 60 ft., 4 Thread, \$0.95; 50 ft.,
Manila, \$1.40; 60 ft., Jute, \$0.75.
Pearl Braided, cotton, No. 6, 30 lb.
25 1/2¢; No. 7, 25¢; Nos. 8 to 12, 24 1/2¢
Eddystone Braided, Nos. 8, 9 and
10, 25¢; 11, 25 1/2¢; 6, 25 1/2¢.
Harmy Cable Laid Italian, Nos. 7
to 10.....\$1.20
Fullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12:
Braided, per lb., Drab Cotton,
40¢; Italian Hemp, 40¢; Linen,
55¢; White Cotton or Spot, 35¢
Massachusetts, White.....30 lb. 30¢
Massachusetts, Drab.....30 lb. 35¢
Phoenix, White, Nos. 8 to 12, 25¢;
No. 7, 27 1/2¢; No. 6, 28 1/2¢.

Silver Lake, per lb.: A, Drab, 45¢; B, White, 40¢; B, Drab, 40¢; A, White, 35¢; Italian Hemp, 40¢; Linen.....57 1/2¢ See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.....\$3.60¢/10.60%
Hendryx Standard Wire Picture Cord,
old list, 85¢/10%

Cradles—

Grain.....40.12 1/2%

Crayons—

White Round Crayons, Cases, 100
gro., \$0.50¢/57.50 at factory, but
lower prices made by jobbers
Zelicker's Lumber:
Red, Blue, Green.....30 gro. \$6.50
Black.....30 gro. \$4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, \$7.00;
Light.....\$6.50

Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, 30 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....30 doz. \$3.00
Wm. Rogers & Son.....30 doz. \$2.50

Cutters—Glass—

H. H. Mayhew Co.:
Red Devil.....40%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%
Nos. 1 2 3 4 B 5
Each.....\$5 \$7 \$10 \$25 \$50 \$60
Enterprise:
Nos. 5 10 12 22 32
No. 202, \$1.50.....40.47 1/2%
Dixon's.....30 doz. 40.50%
Nos. 1 2 3 4
\$14.00 \$17.00 \$19.00 \$30.00
Ideal.....40.10.60.10%
Little Giant.....30 doz. 40.50%
Nos. 305 310 312 320 322
\$35.00 \$48.00 \$44.00 \$72.00 \$68.00
N. E. Food Choppers.....25%
New Triumph No. 605, 30 doz. \$24.00.
40.50%
Russwin Food, No. 1, \$21.00, No. 2,
\$27.00.....45.10.60.10%
Woodruff's.....30 doz. 40.50%
Nos. 100 150
\$15.00 \$18.00
Enterprise Beef Shavers.....25.30%

Slaw and Kraut—

Henry Diston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30
x 9.....50%
Kraut Cutters, 36 x 12, 40 x 12.....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....30 doz. \$3.00
Combined Slaw Cutter and Corn
Grater.....30 doz. \$4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife.....30 gr. \$18.00
Slaw Cutters, 2 Knife.....30 gr. \$22.00

Tobacco—

All Iron, Cheap.....doz. \$4.25¢/4.50
Enterprise.....25.30%
National, 30 doz., No. 1, \$21; No. 2,
\$18.....42%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger, per doz. \$3.00
Iwan's Imp'ved Post Hole Auger, 40.45%
Vaughan Pattern Post Hole Augers,
30 doz., \$4.25
Perfection Post Hole Diggers, 30
doz., \$8.25
Split Handle Post Hole Diggers,
30 doz., \$7.25
Kohler's, 30 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.00; Pioneer.....30 doz. \$7.00
Never-Break Post Hole Diggers, 30
doz., \$24.00.....60%
Samson, 30 doz. \$34.00.....25%

Dividers—See Compasses.

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, 30
doz., \$18; No. 2, \$15; No. 3, \$12;
No. 4, \$18.

Drawing Knives— See Knives, Drawing.

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers.....35%
Diamond Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill,
each.....\$1.50¢/1.75
Breast, Millers Falls.....15.10%
Breast, P. S. & W.....40%
Goodell Automatic Drills, 40.45¢/40.10%
Johnson's Automatic Drills, Nos. 2
and 3.....16%
Johnson's Drill Point.....16%
Millers Falls Automatic Drills, 33.4¢/40%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's, 40%; Weston's, 40%
Ratchet, Weston's, Style H Im-
proved.....40%
Ratchet, No. 012.....40%
Ratchet, Whittey's, P. S. & W. 50%
Whitney's Hand Drill, No. 10, \$10.00.
Adjustable, No. 10, \$12.00.....33 1/2%

Twist Drills—

Bit Stock.....60.45¢/10.60.10.70%
Taper and Straight Shank.....60.10.60.10.65%

Drivers, Screw—

Screw Driver Bits, per doz. \$5.00¢/50¢
Balsey's Screw Holder and Driver, 30
doz., 2 1/2-in., \$6; 4-in., \$7.50; 6-in.,
\$9.00.....50%
Buck Bros' Screw Driver Bits.....30%
Champion.....30%
Edson.....30%
Fray's Hol. H'dle Sets, No. 3, \$12.50;
Ford's Brace Screw Drivers.....40.45%
Gay's Double Action Ratchet.....30%
Goodell's Auto.....50.45¢/10.60.10.65%
Hurwood.....40.10%
Mayhew's Black Handle.....40.10%
Mayhew's Monarch.....40.10%
Millers Falls, Nos. 20 and 21.....25.10%
Millers Falls, Nos. 11, 12, 41, 42, 15.10%
New England Specialty Co.....50.10%
Smith & Hemenway Co.....40.45%
H. D. Smith & Co.'s Perfect H'dle, 40%
Stanley R. & L. Co.'s:
No. 61, Varn. Handles, 65%; No.
86, 75%; Victor, 55%; Defiance, 70%
Swan's
Nos. 7565 to 7568, 50%; No. 7540,
40.10%

Eave Trough, Galvanized—

Territory: L. C. L. Galvanized
Galv. Charcoal Copper.
Steel. Iron. 1 1/2, 1 3/4, 2 oz.

Eastern: 80% 70.45% 40.610%
Central: 75.10.67 1/2% 70% 40.67 1/2%
Western and Southern:
70.60.67 1/2% 60.15.67 1/2% 40.65%
So. Western:
70.620% 65.62 1/2% 40.62 1/2%

Terms—2% for cash. Factory ship-
ments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. 1.
Standard Gauge.....60.10%
No. 26.....50%
No. 24.....35%
No. 22.....30%
Copper.....50%

Elbows, Stove Pipe—

Dorer, one piece.....40%
Perfect Elbows (R. M. Co.).....40%

Emery, Turkish—

5 to 5 1/2 to
46: 220: Flour.
Kegs.....lb. 5 1/4 5 1/4 5 1/4
1/4 Kegs.....lb. 5 1/4 5 1/4 5 1/4
1/2 Kegs.....lb. 5 1/4 5 1/4 5 1/4
10-lb. cans.....6 1/2 6 1/2 6 1/2

10 in case.....6 1/2 7 1/2 6 1/2
10-lb. cans, less
than 10.....10 10 10 10 10 10
Less quantity, 10 10 10 10 10 10
NOTE—In lots 1 to 3 tons a discount
of 10% is given.

Extractors, Lemon Juice

—See Squeezers, Lemon.
Fasteners, Blind—

Zimmerman's 50¢10%
Walling's 40¢10%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined 50¢50¢10%
Metallic Key, Leather Lined 60¢10¢70%

Red Cedar 40¢10¢50%
Petroleum 70¢10¢75%

B. & L. B. Co.:
Metal Key 60¢10%
Star 50¢10%
West Lock 50¢10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50¢10%
John Sommer's Victor Mtl. Key 50¢10%
John Sommer's Duplex Metal Key 40%
John Sommer's Diamond Lock 40%
John Sommer's L. X. L. Cork Lined 50%
John Sommer's Reliable Cork Lined 50¢10%
John Sommer's Chicago Cork Lined 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 40%
John Sommer's Perfection, Cedar 40%
McKenna, Brass:
Burglar Proof, N. P. 25%
Improved, ¾ and ½ inch 25%
Self Measuring:
Enterprise, ¾ doz. \$36.00 40¢10%
Lane's, ¾ doz. \$28.00 40¢10%
National Measuring, ¾ doz. \$36.40 40¢10%

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List revised Nov. 1, 1899.

Best Brands 70¢10¢75¢10%
Standard Brands 75¢10¢75¢10¢10%
Lower Grade 75¢10¢10¢10¢10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 33 1-3¢40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 \$3.75
Fusible Links, No. 96 50%
Expansion Bolts, No. 107 60¢10%
Grindstone—

Net Prices:

Inch 15 17 19 21
Per doz. \$3.25 3.75 4.25 4.75
P. S. & W. Co. 30¢10¢40%
Reading Hardware Co. 60%
Stowell's Giant Grindstone Hanger 40%
Stowell's Grindstone Fixtures, Extra Heavy, 50¢10¢10%; Light 60¢10%

Fodder Squeezers—

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato 60¢10%
Victor, Hay 60¢15¢25%
Victor, Manure 60%
Victor, Header 60%
Champion, Hay 60%
Champion, Header 60%
Champion, Manure 60¢15¢25%
Columbia, Hay 60¢20%
Columbia, Manure 70%
Columbia, Spading 70¢12%
Hawkeye Wood Barley 40%
W. & C. Potato Digger 60¢20%
Acme Hay 60¢20%
Acme Manure, 4 tine 60¢10¢5%
Dakota Header 60¢20%
Jackson Steel Barley 60¢20%
Kansas Header 60%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Saw—

White, 8'g't Bar, per doz. 75¢80¢
Red, 8'g't Bar, per doz. \$1.00¢1.25
Red, Dbl. Brace, per doz. \$1.40¢1.50

Freezers, Ice Cream—

Qt. 1 2 3 4 6
Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.
Hemp \$2.75
Cotton 3.20
Waterproof Sgl. Taped. 3.65
Waterproof Dbl. Taped. 4.40
Waterproof Tpl. Taped. 5.15

Gates, Molasses and Oil—

Stebbins' Pattern 80¢10%

Gauges—

Marking, Mortise, &c. 50¢50¢10%
Chapin-Stephens Co.:
Marking, Mortise, &c. 50¢50¢10%
Scholl's Patent 50¢10¢50¢10%
Door Hangers 50¢50¢10%
Stanley R. & L. Co.'s Butt and Rabbit Gauge 35%
Marking and Mortise 60%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire, P. S. & W. Co. 37½%

Gimlets— Single Cut—

Numbered assort-

ments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Spike, Metal, No. 1, \$1.00; 2, \$1.30

Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60

Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 60¢60¢10%

Glue, Liquid Fish—

Bottles or Cans, with Brush 25¢10¢50%

International Glue Co. (Martin's) 40%

Grease, Axle—

Common Grade gro. \$4.50¢6.00

Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ¾ doz., 1 lb. \$1.20;

2 lb. \$2.00

Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. 33½¢33½¢10%

Grindstones—

Bicycle Emery Grinder \$6.50

Bicycle Grindstones, each \$2.50¢3.00

Pike Mfg. Co.:
Improved Family Grindstones, per inch, ¾ doz. \$2.00

Pike Mower and Tool Grinder, each \$6.00

Grips, Nipple—

Perfect Nipple Grips 40¢10¢2%

Halters and Ties—

Cow Ties 60¢10¢60¢10¢5%

Covert Mfg. Co.:
Web 45%
Jute Rope 45%
Sisal Rope 35%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coll. and Halters 40¢40¢5%
Am. Cow Ties 45¢50%
Niagara Coll. and Halters 45¢50¢5%
Niagara Cow Ties 45¢50¢10¢5%

Hammers—**Handled Hammers—**

Heller's Machinists' 40¢10¢40¢10¢10%

Heller's Farmers' 40¢10¢40¢10¢10%

Magnetic Tack, Nos. 1, 2, 3, \$1.25;

\$1.50, \$1.75 50%

Peck, Stow & Wilcox, Steel 50%

Fayette R. Plumb:
Plumb, A. E. Nail 33½¢7½¢33½¢10¢7½%

Engineers' and B. S. Hand 50¢7½¢50¢10¢7½%

Machinists' Hammers, 50¢50¢10¢5%

Living and Timbers 40¢2½¢40¢10¢2½%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢ 80¢10%

3 to 5 lb., per lb., 40¢ 80¢10%

Over 5 lb., per lb., 30¢ 80¢10¢10%

Wilkinson's Smiths' 1 lb. 9½¢10%

Handles—

Axe, Pick, &c. 60¢10¢60¢10¢5%

Hoe, Rake, &c. 45¢50%

Fork, Shovel, Spade, &c.:
Long Handles 45¢50%

D Handles 50¢50¢5%

Cross-Cut Saw Handles—

Atkins' 40%

Champion 45¢45¢10%

Dixon's 50%

Mechanics' Tool Handles—

Auger, assorted gro. \$2.50¢3.00

Brad Axl. gro. \$1.65¢1.75

Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, \$2.00¢

\$2.65; Hickory \$2.15¢2.40

Socket Firming, Apple, \$1.75¢

\$1.95; Hickory \$1.45¢1.60

Socket Framing, Hickory, \$1.60¢1.75

File, assorted gro. \$1.30¢1.40

Hammer, Hatchet, &c. 60¢10¢60¢10¢5%

Hand Saw, Varnished, doz. 80¢85¢; Not Varnished, .65¢75¢

Plane Handles:
Jack, doz. 30¢; Jack, Bolted, 75¢

Fore, doz. 45¢; Fore, Bolted, 90¢

Chapin-Stephens Co.:
Carving Tool 40¢40¢10%

Chisel 65¢65¢10%

File and Axl. 65¢65¢10%

Saw and Plane 40¢40¢10%

Screw Driver 40¢40¢10%

Millers Falls Adj. and Hatchet Auger Handles 15¢10%

Nicholson Simplicity File Handle, ¾ gro. \$0.85¢1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Al-

lith Adjustable, No. 6; Reliable Parlor Door 50%

Chicago Spring Butt Co.:

Friction 25%

Oscillating 25%

Big Twin 25%

Chisholm & Moore Mfg. Co.:
Raggage Car Door 80%

Elevator 50%

Railroad 50%

Cronk & Carrier Mfg. Co.:
Loose Axle 60¢10%

Roller Bearing 70%

Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00 70%

Roller Bearing, No. 11, \$15.00, 70%

Roller Bearing, Ex. Hy., No. 12, \$16.00 70%

Hinged Hangers, \$16.00 60¢10%

Lane Bros. Co.:
Parlor, Ball Bearing, \$1.00;

Standard, \$3.15; No. 106, \$2.85;

New Model, \$2.80; New Cham-

plin \$2.25

Barn Door, Standard 60¢5%

Hinged Hangers, net \$4.10 60¢2%

Special 70¢5%

Lawrence Bros.:
Advance and Sterling 60¢10%

Cleveland and Peerless 75%

Chippier, No. 15 60%

Crown 60¢10%

Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25 60¢5%

Hummer 70¢5%

New York 60¢10%

McKinney Mfg. Co.:
No. 1, Special, \$15 60¢10%

No. 2, Standard, \$18 60¢10%

Hinged Hangers, \$16.00 50%

Meyers' Stayon Hangers 60¢5%

Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 217, 60¢5%

Pioneer Wood Track No. 3, \$2.00

Ball B'r'g St'l Track No. 10, 50¢10%

Roller B'r'g St'l Track No. 12, \$2.15

Roller B'r'g St'l Track No. 13, \$2.30

Roller B'r'g, Nos. 30, 41, 48, 70¢10%

Hero, Adj. Track No. 19, 50¢10%

Adjustable Track Tandem Trol-

ley Track No. 16, 50¢10%

Seal, Steel Track No. 8, \$2.25

Auto Adj. Track No. 22, 50¢10%

Trolley B. D. No. 37, \$1.25; B. D. No. 120, \$2.10; No. 121, \$2.25; No. 150, \$2.35

Safety Underwriters F. D. No. 101 50%

Tandem No. 41, 2½ and 3 60¢10%

Palace, Adjustable Track No. 122 50¢10%

Royal Adjustable Track No. 122 50¢10%

Ives' Wood Track No. 1, \$2.00

Trolley B. D. No. 20, 50¢10%

Trolley B. D. No. 24, \$1.30; No. 27, \$1.40; No. 28, \$1.60

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢10%

Anti-friction, No. 42; No. 44, sizes 2½ and 3, 60¢5%

Hinged Tandem No. 48, 60¢5%

Folding Door B. B. Swivel No. 135 40%

Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 40%

Ajax Hinge Door 60%

Apes' Parlor Door 50¢10¢5%

Atlas, 60%; Freight Car Door, 50%

Baggage Car Door 50%

Climax Anti-Friction 50¢10%

Elevator 40%

Express 50%

Interstate 60¢10%

Lundy Parlor Door 50¢10%

Magic, 60%; Rex Hinge Door, 60%

Matchless 60¢10%

Nansen 70¢5%

Parlor Door, 50¢10%; Railroad, 50¢10%

Street Car Door 50%

Steel, Nos. 300, 404, 500, 50¢10%

Underwriters' Fire Door 40%

Wild West Warehouse Door, 50%

Zenith for Wood Track 50¢10%

A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%

Climax Anti-Friction 50¢10%

Pilot Hinge, New Perfection 60%

Rider Wagon 60%

Western Pattern 70%

Taylor & Boggs F'y Co.'s Kid-

der's Roller Bearing, 50¢15¢10¢5%

Hangers— Garment—

Pullman Trouser, ¾ gro., 1 pair Flat

Aluminum, \$9.00; 1 pair Round Nick-

eled, \$9.00; 4 pair Round Nick-

eled, \$27.00; 1 pair Flat Gun Metal, \$12.00;

1 pair Flat Black Enameled, \$7.50;

1 pair Wood Clamp, \$13.00; Skirt

Hangers, Folding, per gro., \$21.00;

Coat Hangers, Folding, per gro., \$3.00;

Garment Hanger Rods, Round

Nickel, per gro., \$15.00; Garment

Hanger Loops, Round Nick-

eled, per gro., \$15.00

Victor Folding ¾ gro. \$9.00

Western, W. G. Co. 70¢10%

Gate—

Myers' Patent Gate Hangers, ¾ doz. net \$4.

Screw Hook and Strap. { 6 to 12 in. 1b. 3.4¢
14 to 20 in. 1b. 3.5¢
22 to 36 in. 1b. 3.6¢

Screw Hook and Eye.
1/4 to 1 inch. 1b. 6.4¢
1/2 inch. 1b. 7.4¢
3/4 inch. 1b. 8.4¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers. 30¢2¢

Hods— Coal—

Inch. 15 16 17 18
Galv. Open. \$2.50 2.75 3.00 3.25
Jap. Open. \$1.90 2.10 2.25 2.55
Galv. Funnel. \$3.00 3.30 3.60 3.90
Jap. Funnel. \$2.45 2.65 2.85 3.30

Masons' Etc.—

Cleveland Wire Spring Co.:
Steel Brick, No. 102. each \$0.95
Steel Mortar, No. 158. each \$1.25

Hoes— Eye—

Scovill and Oval Pattern—
60¢10¢60¢10¢10¢

Grub, list Feb. 23, 1899.
70¢10¢75¢10¢

D. & H. Scovill.
Handled—

NOTE—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding No. 1, \$2.00; No. 2, \$2.25
Ft. Madison Cotton Hoe. 70¢10¢10¢
Ft. Madison Crescent Cultivator Hoe. 70¢10¢
Ft. Madison Mattock Hoes:
Regular Weight. 60¢ doz. 66%
Junior Size. 50¢ doz. \$4.00
Ft. Madison Sprouting Hoe. 50¢ doz. 50%
Ft. Madison Dixie Tobacco Hoe. 75¢10¢10¢
Kretzinger's Cut Easy. 70¢10¢
Warren Hoe. 45¢10¢
W. & C. Ivahoe. 75¢10¢
B. B. 6 in. Cultivator Hoe. \$3.15
B. B. 6 1/2 in. 3.35
Acme Wedding. 30¢ doz. \$4.35
W. & C. Lining Shovel Hoe. 30¢ doz. \$4.85

Hoisting Apparatus—

See Machines, Hoisting.

Holders— Bit—

Angular, 30¢ doz. 45¢10¢

Door—

Bardsley's. 45%
Empire. 50%
Pullman. 50%
Superior. 33%10¢

File and Tool—

Nicholson File Holders and File Handles. 33%10¢

Fruit Jar—

Triumph Fruit Jar Holder, 30¢ gross, 10¢ doz. \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian, German and Swat. 50%

Hooks—Cast Iron—

Bird Cage, Reading. 50%
Clothes Line, Reading List. 40%
Clothes Line, Stowell's. 70%
Coat and Hat, Reading. 45¢20¢
Coat and Hat, Stowell's. 65%
Coat and Hat, Wrightsville. 65%
Harness, Reading List. 40%
Harness, Stowell's. 70%
School House, Stowell's. 70%

Wire—

Belt. 80¢10¢10¢
Wire C. & H. Hooks. 75¢10¢75¢10¢10¢

Columbian Hdw Co. Gum. 70¢10¢
Parker Wire Goods Co., King. 70¢10¢
Van Wagoner, Coat and Hat. 70%
Western W. G. Co. Molding. 75%
Wire Goods Co.:
Acme, 60¢10¢; Chief, 70%; Crown, 75%;
Czar, 65%; V. Brace, 75%;
Czar Harness, 50¢10¢.

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in., \$1.25; 10 in., \$1.50.

Cotton. 10¢ doz. \$1.05@1.25

Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—

Hooks, Bench, See Staps, Bench.
Bush, Light, doz. \$1.75; Medium, \$5.35; Heavy, \$6.25
Grass, best, all sizes, per doz. \$1.60
Grass, common grades, all sizes, per doz. \$1.30
Whiffletree. 1b. 5%¢6¢

Hooks and Eyes:
Brass. 60¢5¢60¢10¢65%
Malleable Iron. 70¢70¢10¢
Covert Mfg. Co. Gate and Scuttle Hooks. 40%
Ft. Madison Cut-Easy Corn Hooks. 30¢ doz. \$3.25 net

Bench Hooks—See Bench Staps.
Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, 3/4-inch.
Competition. ft. 5 @ 6¢
3-ply Guaranteed. ft. 8 @ 9¢
4-ply Guaranteed. ft. 10 @ 11¢
Cotton Garden, 3/4-in., coupled.
Low Grade. ft. 8 @ 9¢
Fair Quality. ft. 10 @ 11¢

Irons— Sad—

From 4 to 10. 1b. 9¢10¢
B. B. Sad Irons. 1b. 5%¢5%
Mrs. Potts', cents per set:
Nos. 50 55 60 65
Jap'd Tops. 65 62 75 72
Tin'd Tops. 70 67 80 77
New England Pressing. 1b. 5%¢14¢

Pinking—
Pinking Irons. doz. 60¢

Irons, Soldering
See Copiers.

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw. 30¢2¢; Steel, 45%
Lockport. 50%
Lane's Steel. 30¢10¢2¢
Richards' Tiger Steel, No. 130. 50¢10¢
Smith & Hemenway Co.'s. 25%

Kettles—
Brass, Spun, Plain. 20¢25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros' Butcher, &c. 30%
Wilkinson Shear & Cutlery Co. 60%

Corn—

Wilkinson Wilcut Brand Knives and Hooks. 60%
Washington Acme. 30¢ doz. \$2.65;
Dent, \$2.75; Adj. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—

Standard List. 75¢65¢75¢10¢
C. E. Jennings & Co., Nos. 15, 46, 60;
Jennings & Griffin, Nos. 41, 42. 60%
Swan's. 75%
Watrous. 15%
L. & J. J. White. 20¢5¢25%

Hay and Straw—

Serrated Edge, per doz. \$5.75@6.00
Ivan's Sickle Edge. 30¢ doz. \$9.50
Ivan's Serrated. 30¢ doz. \$10.00

Mincing—

Buffalo. 30¢ gro. \$13.00

Miscellaneous—

Farriers'. 30¢ doz. \$3.00@3.25
Wostenholm's. 30¢ doz. \$3.00@3.25

Knobs—

Base, 2 1/2-inch, Birch, or Maple,
Rubber Tip. 30¢ doz. \$1.25@1.50

Carriage, Jap., all sizes. 40¢45¢
gro. 40¢45¢

Door, Mineral. 65¢ doz. 65¢70¢
Door, Por. Jap'd. 70¢75¢
Door, Por. Nickel. doz. \$2.05@2.15
Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See Belting, Leather—

Ladders, Store, &c.—

Allith Mfg. Co., Reliable. 50%
Lane's Store. 50%
Myers' Noiseless Store Ladders. 50%
Richards Mfg. Co.:
Improved Noiseless, No. 112. 50%
Climax Shelf, No. 113. 50%
Trolley, No. 109. 50%

Ladies, Melting—

L. & G. Mfg. Co. (low list). 25%
P. S. & W. 50%
Reading. 60%

Lanterns— Tubular—

Regular Tubular, No. 0. 40¢
doz. \$4.25@4.50

Lift Tubular, No. 0. 40¢
doz. \$4.75@5.00

Hinge Tubular, No. 0. 40¢
doz. \$4.75@5.00

Other Styles. 40¢
doz. \$4.05@4.50

Bull's Eye Police—

No. 1, 2 1/2-inch. \$2.75@3.00
No. 2, 3-inch. \$3.00@3.25

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron. 50%
Stowell's Badger, Cast Iron. 50%

Latches— Thumb—

Roggin's Latches, with screw. 35¢40¢
doz. 35¢40¢

Door—

Allith Mfg. Co., Automatic, No. 400. 40¢
doz. \$4.00

Cronk & Carrier Mfg. Co., No. 101. 40¢
doz. \$2.30

Cronk & Carrier Mfg. Co., Latch, Hasp and Staples. 50%
Richards' Bull Dog, Heavy, No. 125. 50%
Richards' Trump, No. 127. 50%
Stowell's Steel. 50%

Leaders, Cattle—

Small. 50¢ doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45%;
Sisal, 33%.

Lifters, Transom—

R. & E. 33%10¢

Lines—

Wire Clothes, Nos. 15 19 20
100 feet. \$2.25 2.00 1.75
75 feet. \$1.75 1.35 1.10

Anniston Waterproof Clothes, 50 ft. 30¢
gro. \$25.00; Gilt Edge, \$23.00; Air
Line, \$23.00; Acme, \$18.00; Alabama,
\$17.00; Empire, \$16.00; Advance,
\$14.00; Eclipse, \$13.50; Chicago,
\$11.50; Standard, \$10.50; Columbia,
\$9.50; Allston, \$13.50; Calhoun, \$12.00.

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40%
Silver Lake Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3,
\$7.50; No. 4, \$8.00; No. 5, \$8.50;
White Cotton, No. 3 1/2, \$1.50; No. 4,
\$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2,
\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;
No. 4 1/2, \$4.50.

Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Draw Cotton,
\$3.50.

Clothes Lines, White Cotton: 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75 ft.,
\$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
100 ft., \$5.25.

20%

Locks— Cabinet—

Cabinet Locks. 33 1/2¢33 1/2¢47 1/2¢
NOTE—Net prices are very often made on these goods.

Reading Hardware Co. 40%
R. & E. Mfg. Co. 40%

Elevator—

Stowell's. 50%

Padlocks—

Wrought Iron. 75¢10¢5¢80¢5%
Net prices are general.

R. & E. Mfg. Co. Wrought Steel and Brass. 75¢10%

Sash, &c.—

Ives' Patent:
Bronze and Brass, 62 1/2%; Crescent,
50¢10%; Iron, 62 1/2%; Window Ventilating,
60%; Robinson Pat. Ventilating Sash Lock, 40%; Wrought
Bronze and Brass, 55%; Wrought Steel, 55%.

Pullman Patent Ventilating Lock. 25%
Reading. 40%

Machines—Boring—

Com. Up'r't, without Augers. \$2.00@2.25
Com. Ang'l'r, without Augers. \$2.25@2.50

Swan's Improved. 40¢10%
Angular. 40¢10%

Jennings' Nos. 1 and 4. 35¢5%
Miller's Fall Perfection. 32¢00
Snell's Rice's Pat. 2.50 2.75

Corking—

Reisinger Invaluable Hand Power. 30¢ doz. \$18.00

Fence—

Williams' Fence Machines. each, \$5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block. 30%
Moore's Hand Hoist, with Lock Brake. 20%

Ice Cutting—

Chandler's. 12%10%

Washing—

Boss Washing Machine Co.: Per doz.
Boss No. 1. \$57.00
Boss Rotary. \$4.00
Champion Rotary Banner No. 1. \$54.00
Standard Champion No. 1. \$48.00
Standard Perfection. \$26.00
Cinti Square Western. \$30.00
Uneda American, Round. \$30.00

Mallets—

Hickory. 45¢5¢50%
Lignumvite. 45¢5¢50%
Tinnars' Hickory and Applewood. 45¢5¢50%

Mangers, Stable—

Swett Iron Works. 50%

Mashers, Vegetable—

Western W. G. Co., Potato. 60¢10%
Elastic Steel (W. G. Co.), new list. 50¢10%

Mats, Door—

Keystone Wire Matting Co.:
Keystone. 50%
Ideal. 50%

Mattocks—

See Picks and Mattocks.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—

Enterprise Mfg. Co. 20¢25%
National list Jan. 1, 1902. 30%
Parker's Columbia & Victoria. 50¢10¢60%
Parker's Box and Side. 50¢10¢60%
Swift, Lane Bros. Co. 30%

Mowers, Lawn—

NOTE—Net prices are generally quoted cheapcut. all sizes, \$1.85@2.00
Cheap. all sizes, \$2.00@2.50
Better Grade. all sizes, \$2.50@4.50

12 1 1/2 16 18-in.

High Grade. \$4.50 4.75 5.00 5.25

Continental. 60¢5%
Great American. 70%
Great American Ball B'r'g, new list. 70%
Quaker City. 60¢5%
Pennsylvania. 60¢5%
Pennsylvania, Jr., Ball Bearing. 60%
Pennsylvania Golf. 50%
Pennsylvania Horse. 33%5%
Pennsylvania Pony. 40¢5%
Granite State:

Style A, Low Wheel. 70¢10¢10¢5%
Style B, Low Wheel. 70¢10¢5%
Style C, High Wheel. 70¢10%
Style D, High Wheel. 70%

Philadelphia:
Styles M., S. C. K., T. 70¢5%
Style A, all Steel. 60¢5%
Style B, High Wheel. 70¢10¢5%
Drexel and Gold Coin, special list. 50%

Nails—

Wire Nails and Brads. Miscellaneous. 85¢10¢85¢10¢45%
Cut and Wire. See Trade Report.

Hungarian Finishing, Upholsterers' &c. See Tacks.

Horse—

Nos. 1 7 8 9 10
Anchor. 23 21 20 19 18. 40¢5%
Champion. 28 26 25 24 23. 50%
Coleman. 13 12 11 11 11. net
New Haven. 23 21 20 19 18. 40¢5%
Western. 20¢10%
Jobbers' Special Brands. per lb. 9¢10¢

Picture—

Brass H'd. 45 55 60 70. gro
Por. Head. 1.10 1.10 1.10. gro

Nippers—

See Pliers and Nippers.

Nuts—

Cold Punched. Off list.
Square, Blank or Tapped. 4.90¢5.00¢
Hexagon, Blank or Tapped. 5.50¢5.40¢

Square, Blank, C. & T. 5.20¢5.30¢
Hexagon, Blank, C. & T. 5.90¢6.00¢

Hot Pressed:
Square, Blank. 5.10¢5.20¢
Hexagon, Blank. 5.50¢5.60¢
Square, Tapped. 5.00¢5.10¢
Hexagon, Tapped. 5.40¢5.50¢

Oakum—

Rest. 1b. 6%
U. S. Navy. 1b. 6¢
Navy. 1b. 5¢
Plumbers' Spun Oakum. 3%
In carload lots 1/2 lb. off, f.o.b. New York.

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper. 50¢10%
Tin or Steel. 65¢10¢50¢70%
Zinc. 65¢10¢50¢70%
Chase or Paragon:
Brass and Copper. 50¢10%
Tin or Steel. 65¢10%
Zinc. 65¢10%
Malleable, Hammers' Imm'd. Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.

American Tube & Stamping Co.:
Spring Bottom Cans. 70¢70¢10%
Railroad Oilers, &c. 60¢60¢10%

Openers— Can— Per doz.

Sprague, Iron Handle. 30¢35¢
Sprague, Wood Handle. 35¢40¢
Sardine Scissors. \$1.75@3.00
National. 50¢10%
Stowell's Sprague. 35¢ doz. \$5.45¢
Vim Tin Shear and Can Opener. 30¢ doz. 75¢; per gro., \$7.50

Egg—

Nickel Plate, 30¢ doz., \$2.00; Silver Plate, \$4.00.

Packing—

Asbestos Packing, Wick and Rope. 17¢22¢

Rubber—

(Fair quality goods.)

Sheet, C. I. 11¢12¢
Sheet, C. O. S. 11¢12¢
Sheet, C. B. S. 12¢13¢
Sheet, Pure Gum. 40¢45¢
Sheet, Red. 40¢45¢
Jenkins' 96, 10 lb 80¢ 25¢5¢

Miscellaneous—

American Packing. 1b. 76¢10¢
Cotton Packing.

Reading 78.....	doz.	\$6.25
Locking Table.....	doz.	\$6.25
Turn Table.....	doz.	\$6.00
White Mountain.....	doz.	\$5.00

Potato—

Baratona.....	doz.	\$7.00
White Mountain.....	doz.	\$6.00

Picks and Mattocks—

List, Feb. 23, 1899.....	75¢@75¢
Cronk's Handled Garden M.....	65¢@10%
doz., 6.40.....	33%

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass.....	50¢@10¢@60%
Iron, list Nov. 11, '85.....	60¢@60¢@10%

Pipe, Cast Iron Soil—

Carload lots.

Standard, 2-6 in. 50¢@10¢@50¢@10¢	
Extra Heavy, 2-6 in.	65¢@10%
Fittings.....	70¢@10¢@70¢@10¢

Pipe, Merchant—

Consumers, Carloads.

	Blk. Galv.	Blk. Galv.	Blk. Galv.
1/2 in. 71	55	63	52
3/4 in. 73	59	79	56
1 in. 75	63	72	60
1 1/4 in. 79	69	76 1/2	64 1/2
7 to 12 in. 74	59	71 1/2	56 1/2

Pipe, Vitrified Sewer—

Carload lots.

Standard Pipe and Fittings, 2 to 24 in.:	
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New England.....	68%
New York and New Jersey.....	71%
Maryland, Delaware, E. Pa. 73	
West. Pa. and West Va.	75%
Virginia.....	76%
Ohio, Michigan and Ky.	75%
Indiana.....	77%

NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested: C. L. L. C. L.	
5 in., per 100 joints.....	\$3.00
6 in., per 100 joints.....	7.50
7 in., per 100 joints.....	8.50

Planes and Plane Irons—**Wood Planes—**

Bench, first qual.	35¢@35¢@10%
Bench, second qual.	45¢@55¢@10%
Molding.....	30¢@30¢@10%
Bailey's (Stanley R. & L. Co.).....	4%
Chapin-Stephens Co.:	
Bench, First Quality.....	35%
Bench, Second Quality.....	45%
Molding and Miscellaneous.....	35%
Toy and German.....	35%
Chapin's.....	60%
Union.....	60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....	40%
Chapin's Iron Planes.....	50¢@10%
Miscellaneous Planes (Stanley R. & L. Co.).....	35%
Union.....	60%

Plane Irons—

Wood Bench Plane Irons.....	25¢@25¢@10%
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Ruck Bros.....	32%
Chapin-Stephens Co.....	35%
Stanley R. & L. Co.....	35%
Union.....	50%
L. & I. J. White.....	20¢@25¢@25%

Planters, Corn, Hand—

Kohler's Eclipse.....	doz. \$6.50
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Plates—

Felloc.....	lb. 4¢@4¢
Self-Sealing Pie Plates (R. M. Co.).....	doz. \$2.00.....50%

Pliers and Nippers—

Button Pliers.....	75¢@10¢@75, 10, 5%
Gas Burner, per doz., 5 in., \$1.25	
@ \$1.50; 6 in., \$1.45 @ \$1.50.	
Gas Pipe.....	7 8 10 12 in.
	\$2.00 \$2.25 \$2.75 \$3.50

Crook Nippers.....	50¢@5%
Acme & Carrier Mfg. Co.:	
American Button.....	75¢@10%
Cronk's.....	60%
Stub's Pattern.....	50%
Combination and others.....	33%
Heller's Farriers' Nippers, Pinners and Tools.....	40¢@10¢@40¢@10%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....	40%
P. S. & W. Timmers' Cutting Nippers.....	40%
Wm. Schollhorn Co.:	
Bernard, 33 1/2%; Elm City, 33 1/2%;	
Lodi, 50%; Paragon, 50%.	
Sweat Side, End and Diagonal Cutting Pliers.....	60%
Utica Drop Forge & Tool Co.:	
Pliers and Nippers, all kinds.....	65%

Plumbs and Levels—

Chapin-Stephens Co.:	
Plumbs and Levels.....	30¢@30¢@10¢@5%
Chapin's Imp. Brass Cor. 40¢@40¢@10%	
Pocket Levels.....	30¢@30¢@10¢@5%
Extension Sights.....	30¢@30¢@10¢@5%
Machinists' Levels.....	40¢@40¢@10%
Diston's Plumbs and Levels.....	70%
Diston's Pocket Levels.....	70%
C. E. Jennings & Co.'s Iron, 40¢@10%	
C. E. Jennings & Co.'s Iron, 40¢@10%	
Stanley R. & L. Co.....	40¢@10%
Stanley's Duplex.....	45%
Woods' Extension.....	33 1/2%

Poachers, Egg—

Buffalo Steam Egg Poachers, per doz., No. 1, \$6.00; No. 2, \$5.00; No. 3, \$4.00; No. 4, \$3.00.	
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Points, Glaziers—

Bulk and 1-lb. papers.....	lb. 10¢
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1/2-lb. papers.....	lb. 9¢@10 1/2¢
1/4-lb. papers.....	lb. 9¢@11¢

Pokes, Animal—

Ft. Madison Hawkeye.....	doz. \$3.25
Ft. Madison Western.....	doz. \$4.00

Police Goods—

Manufacturers' Lists.....	25¢@25¢@5%
Tower's.....	25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, \$1.25; doz., \$12.00; No. 2, 10 lb can (cake), each, \$2.50; doz., \$24.00.	
Prestoline Liquid, No. 1 (1/2 pt.), doz., \$3.00; No. 2 (1 qt.), \$9.72.....	40%
Prestoline Paste.....	40%
George William Hoffman:	
U. S. Metal Polish Paste, 3 oz. boxes, per doz. 50¢; doz. \$4.50;	
1/2 lb boxes, per doz. \$1.25; 1 lb boxes, per doz. \$2.25.	
U. S. Liquid, 8 oz. cans, per doz., \$1.25; per gro., \$12.00.	
Barkeepers' Fried Metal Polish, per doz., \$1.75; per gro., \$18.00.	
Wynn's White Silk, 1/2 pt. cans, doz.,	\$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, per doz. \$1.50; 10 lb cans, per doz. \$2.50.	
Black Eagle, Liquid, 1/2 pt. cans, per doz. \$1.50; 10 lb cans, per doz. \$2.50.	
Black Jack Paste, 1/2 lb cans, per doz. \$1.50; 10 lb cans, per doz. \$2.50.	
Black Kid Paste, 5 lb cans, each, \$0.65.	
Ladd's Black Beauty Liquid, per 100 tins.....	\$6.75
Joseph Dixon's, per gr. \$5.75.....	10%
Dixon's Plumbago.....	10%
Kreside.....	10%
Gem, per gr. \$1.50.....	10%
Japanese.....	10%
Jet Black.....	10%
Peerless Iron Enamel, 10 oz. cans, doz.,	\$1.50

Wynn's:	
Black Silk, 5 lb pail.....	each 70¢
Black Silk, 1/2 lb box.....	doz. \$1.00
Black Silk, 5 oz. box.....	doz. \$1.00
Black Silk, 1/2 pt. liq.....	doz. \$1.00

Poppers, Corn—

1 qt., Square.....	gro. \$8.00
1 qt., Round.....	gro. \$9.00
1 1/2 qt., Square.....	gro. \$10.00
2 qt., Square.....	gro. \$12.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Post, each, 5 ft., 42¢;	
6 ft., 46¢; 7 ft., 48¢.	
Steel Hitching Posts.....	each \$1.30

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enamelled.....	40%
Tinned.....	35%

Powder—

In Canisters:	
Duck, 1 lb.....	each 45¢
Fine Sporting, 1 lb.....	each 75¢
Rifle, 1/2 lb.....	each 15¢
Rifle, 1 lb.....	each 25¢
In Kegs:	
12 1/2-lb. kegs.....	\$3.50
25-lb. kegs.....	\$4.50
King's Semi-Smokeless:	
Keg (25 lb bulk).....	\$6.50
Half keg (12 1/2 lb bulk).....	\$3.50
Quarter keg (6 1/4 lb bulk).....	\$1.90
Case 24 (1 lb cans bulk).....	\$3.50
Half case (1 lb cans bulk).....	\$4.50
King's Smokeless: Shot Gun, Rifle.	
Keg (25 lb bulk).....	\$12.00 \$15.00
Half keg (12 1/2 lb bulk).....	6.25 7.75
Quarter keg (6 1/4 lb bulk).....	3.25 4.00
Case 24 (1 lb cans bulk).....	14.00 17.00
Half case 12 (1 lb c. bk).....	7.25 8.75
Robin Hood Sm'less Shot Gun.....	50¢@20%

Presses—

Fruit and Jelly—	
Enterprise Mfg. Co.....	30¢@25%

Seal Presses—

Morrill's No. 1, per doz., \$20.00.....	50%
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Pruning Hooks and Shears

See Shears.

Pullers, Nail—

Cyclops.....	50%
Miller's Falls, No. 3, per doz., \$12.00.	
Morrill's No. 1, Nail Puller, per doz., \$20.00.....	50%
Pearson No. 1, Cyclone Spike Puller, each \$30.00.....	50%
Scranton, Case Lots:	
No. 2B (large).....	\$5.00
No. 3B (small).....	\$5.00
Smith & Hemerway Co.:	
Diamond B, case lots, per doz., No. 2, \$6.00; No. 3, \$5.50.	
Giant No. 1, per doz. \$18; No. 2, \$16.50; No. 3, \$15.....	30%
Staple Pullers.....	60%
Parrot Tack and Stub Puller, per doz., 75c; per gro., \$6.00.	

Pulleys, Single Wheel—

Inch.....	1 1/2 1 3/4 2 3
Awning or Tackle.....	
doz.	\$0.30 \$1.50 1.05
Hay Fork, Swivel or Solid Eye, doz., 4 in., \$1.25; 5 in., \$1.55	
Inch.....	1 1/2 1 3/4 2 3
Hot House, doz.	\$0.65 \$1.50 1.05
Inch.....	1 1/2 1 3/4 2 3
Screw, doz.	\$0.15 \$1.25 1.05
Inch.....	1 1/2 1 3/4 2 3
Side, doz.	\$0.25 \$1.40 1.05
Inch.....	1 1/2 1 3/4 2 3
Stowell's:	
Ceiling or End, Anti-Friction.....	60¢@10%
Dumb Waiter, Anti-Friction.....	60¢@10%
Electric Light.....	60%
Side, Anti-Friction.....	60¢@10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1 1/2 and 2 in.	
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Auger Mortise, no Face Plate—

per doz., 1 1/2 and 2 in.	17¢@10%
Acme.....	1 1/2 in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 1, 2 in.	doz. 50%
Grand Rapids All Steel Noiseless.....	70¢@10%
Ideal.....	1 1/2 in., 16¢; 2 in., 19¢
Niagara.....	1 1/2 in., 16¢; 2 in., 19¢
No. 26, Troy.....	1 1/2 in., 16¢; 2 in., 19¢
Star.....	1 1/2 in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.	

Pumps—

Cistern.....	60¢@60¢@10%
Pitcher Spout.....	80¢@80¢@10%
Wood Pumps, Tubing, &c.....	45¢@30%
Barnes Dbl. Acting (low list).....	50%
Barnes' Pitcher Spout.....	75¢@10¢
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....	\$16.00
Daisy Spray Pump.....	\$6.75
Flint & Walling's, Fast Mail Hand, (low list).....	55%
Flint & Walling's Fast Mail (low list).....	55¢@5%
Flint & Walling's Tight Top Pitcher.....	50%
National Specialty Mfg. Co., Measuring.....	30%
Mechanical Sprayer.....	\$6.00
Myers' Pumps (low list).....	50%
Myers' Power Pumps.....	50%
Myers' Spray Pumps.....	50¢@10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:	
Inch.....	2 2 1/2 3 3 1/2
	\$2.20 2.50 2.75 3.00
Inch.....	3 3 1/2 3 3/4 4
	\$3.30 3.60 3.85 4.10 4.40
Plunger Cup Leathers—Per 100:	
Inch.....	2 1/2 3 3 1/2 4
	\$2.75 3.85 5.00 6.00

Punches—

Saddlers' or Drive, good.....	doz. 50¢@75¢
Spring, single tube, good quality.....	\$1.75¢@2.00
Revolving (4 tubes).....	doz. \$3.50@3.75
Bemis & Call Co.'s Cast St'l Drive.....	50%
Bemis & Call Co.'s Check.....	50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D.....	50%
Hercules, 1 die, each \$5.00.....	50%
Niagara Hollow Punches.....	40%
Niagara Solid Punches.....	55¢@10%
Wm. Schollhorn Co.:	
Bernard.....	33 1/2%
Lodi, 50%; Paragon.....	50%
Steel screw, B. & K. Mfg. Co.....	50%
Timmer's Hollow P., S. & W. Co.....	40%
Timmer's Solid, P. S. & W. Co.....	40%
doz., \$1.44.....	60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.....	2 1/2¢@2 1/2¢
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Sliding Door, Wrought Brass—

1 1/2 in., lb. 36¢.....	30%
Allith Mfg. Co.: Reliable Hanger Track.....	50%
Cronk's:	
Double Braced Steel Rail, per ft. 2 1/2 c	
O. N. T. Rail.....	2 1/2¢
Griffin's:	
xxx, per 100 ft., 1 x 3-16 in., \$3.00;	
1 1/2 x 3-16 in., 3.50.	
Hinged Hanger, per 100 ft., 1 x 3-16 in., \$3.10; 1 1/2 x 3-16 in., \$3.60.	
Lane's:	
Hinged Track, per 100 ft., 1 in., \$3.40;	
1 1/2 in., \$4.10.	
O. N. T., per 100 ft., 1 in., \$2.75; 1 1/2 in., \$3.50; 1 1/2 in., \$4.00.	
Standard, 1 1/2 in., per 100 ft. \$4.00	
Lawrence Bros.:	
per 100 ft., No. 201, \$4.00; No. 202, \$4.00	
New York, 1 x 3-16 in., per 100 ft. \$2.75	
McKinney's:	
Hinged Hanger Rail, per ft., 1 1/2¢.....	50%
None Better.....	per ft. 3 1/2¢
Standard.....	per ft. 4¢
Myers' Slayon Track.....	60¢@10%
Richards' Mfg. Co.:	
Common, 1 x 3-16 in., \$3.00; 1 1/2 x 3-16, \$3.25; 1 1/2 x 3-16, \$3.50.	
Special Hinged Hanger Rail.....	60¢@10%
Lag Screw Rail, No. 65.....	50%
Gauge Trolley Track, per ft., No. 31, 5¢; No. 32, 14¢; No. 33, 20¢.	
No. 50, 60¢@10%	
Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64, \$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1, \$3.25; 49, No. 2, \$3.50.	
Stowell's:	
Cast Rail.....	per ft. 1 1/2¢
Steel Rail, Plain.....	2 1/2¢
Wrought Bracket, 1 1/2 x 5-16 in., per ft. 1 1/2¢	
Wrought Bracket, 1 1/2 x 5-16 in., per ft. 1 1/2¢	
Swift's Hyllo, per ft. 1 1/2¢.....	50%
P. L. B. Steel Rail.....	per 100 ft. \$3.00
No. 0, 1 x 3-16 in., per 100 ft. \$2.75	

Rakes—

NOTE.—Many goods are sold at net prices.

Fort Madison Red Head Lawn.....	\$3.25
Fort Madison Blue Head Lawn.....	\$2.75
Jackson doz., net.....	\$4.25
Cronk's:	
New Champion Garden, 1/2 doz., 12	
teeth, \$15.00, 1/2 \$16.50, 1/2 \$18.00..75	
Victor Garden, 1/2 doz., 12 teeth,	
\$15.00, 1/2 \$16.50, 1/2 \$18.00.....80	
Queen City Lawn, 1/2 doz., 20 teeth,	
\$3.45; 21 \$3.60.....net	
Anticlor Lawn, 1/2 doz.....	\$4.00
Malleable Garden.....	70&10
Kohler's:	
Lawn Queen, 20-teeth.....	1/2 doz \$3.00
Lawn Queen, 24-teeth.....	1/2 doz \$3.60
Paragon, 20-teeth.....	1/2 doz \$2.75
Paragon, 24-teeth.....	1/2 doz \$3.00
Steel Garden, 14-teeth.....	1/2 doz \$2.40
Malleable Garden, 14-teeth.....	1/2 doz \$2.00
	\$1.75@2.00

Rules

Boxwood	60@60&10%
Ivory	35&10@55&10&5%
Chapin-Stephens Co.	
Boxwood	60%
Flexfold	27&10&10%
Ivory	35&10&10%
Miscellaneous	50@50&10&10%
Stephens' Combination	55&5&10%
Stationers'	10&10&10%
Keuffel & Esser Co.	
Folding, Wood	35&10%
Folding, Steel	33&10%
Lufkin's Steel	50&10%
Lufkin's Lumber	60%
Stanley R. & L. Co.	
Boxwood	62%
Ivory	45%
Miscellaneous	60%
Zig Zag, Pin Joint	40%
Unson Nut Co.	42%
Boxwood	60@60&10%
Ivory	35&10&5&10&10%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Saws—

Atkins:	
Circular	50%
Band	50&10&60%
Cross Cuts	35&10%
Mulay Mill and Drag	35%
One-Man	40%
40% Hand, Compass, &c., 40%	
Chapin-Stephens Co.	
Turning Saws and Frames	30@50&10%
Diamond Saw & Stamping Works	
Sterling Kitchen Saws	30&10&10%
Disston's:	
Circular, Solid and Notched Tooth	50%
Band, 2 to 14 in. wide	60%
Band, 14 to 18 in.	60%
Crosscuts	50%
Narrow Crosscuts	50%
Mulay, Mill and Drag	35%
Framed Woodsaws	35%
Woodsaw Blades	35%
Woodsaw Rods	25%
Hand Saws, Nos. 12, 9, 9, 16, d100	25%
D, 120, 76, 77, 8	25%
Hand Saws, Nos. 7, 107, 107, 3, 1	25%
0, 0, Combination	25%
Compass, Key Hole, &c.	35%
Butcher Saws and Blades	35%
C. E. Jennings & Co.'s:	
Back Saws	25%
Butcher Saws	30%
Compass and Key Hole Saws	35%
Framed Wood Saws	35%
Hand Saws	20&2%
Wood Saw Blades	35%
Millers Falls:	
Butcher Saws	15&10%
Star Saw Blades	15&10%
Peace & Richardson's Hand Saws	30%
Simonds:	
Circular Saws	50%
Crescent Ground Cross Cut Saws	35%
One-Man Cross Cuts	40&10%
Gang Mill, Mulay and Drag Saws	50%
Band Saws	50%
Back Saws	25@25&7%
Butcher Saws	35@35&7%
Hand Saws	25@25&7%
Hand Saws, Bay State Brand	40%
Compass, Key Hole, &c.	25@25&7%
Wood Saws	35@35&7%
Springfield Mach. Screw Co.	
Diamond Kitchen Saws	40&10&50%
Butcher Saws and Blades	35@40%
Wheeler, Madden & Clemens Mfg. Co.'s Cross Cut Saws	50%

Hack Saws—

Atkins' Hack Saw Blades A A A.	25%
Disston's:	
Concave Blades	25%
Keystone	40%
Hack Saw Frames	30%
Fitchburg File Works, The Best	30%
C. E. Jennings & Co.'s	
Hack Saw Frames, Nos. 175, 180	40&7%
Hack Saws, Nos. 175, 180, complete	40&7%
Goodell's Hack Saw Blades	40%
Griffin's Hack Saw Frames	35&5&10%
Griffin's Hack Saw Blades	35&5&10%
Springfield Mach. Screw Co.	
Diamond Hack Saw Blades	35%
Diamond Hack Saw Frames	50%
Star Hack Saws and Blades	15&10%
Sterling Hack Saw Blades	30&10&5%
Sterling Hack Saw Frames	30&10&10%
Sterling Power Hack Saw Machines	
each, No. 1, \$25.00; No. 2, \$30.00	10%
Victor Hack Saw Blades	25%
Victor Hack Saw Frames	40%

Scroll—

Barnes, No. 7, \$15.	25%
Barnes' Scroll Saw Blades	40%
Barnes' Velocipede Power Scroll Saw	
without boring attachment, \$18.	
with boring attachment, \$30.	25%
Lester, complete, \$10.00	10%
Rovers, complete, \$4.00	15&10%

Scales—

Family, Turnbull's	50@50&10%
Counter:	
Hatch, Platform, 1/4 oz. to 4 lbs.	35.50
Two Platforms, 1/4 oz. to 8 lbs.	40.00
Union Platform, Plain \$1.70	1.90
Union Platform, Stpd. \$1.85	2.15
Chattillon's:	
Eureka	25%
Favorite	40%
Crocker's Trip Scales	50%
Chicago Scale Co.	
The "Little Detective"	25.00
Union or Family No. 2	60%

Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	25&35%
"The Standard" Portables	50%
"The Standard" R. R. and Wagon	50%

Scrapers—

Box, 1 Handle	22.50
Box, 2 Handle	22.50
Ship	Light, \$2.00; Heavy, \$4.50
Adjustable Box Scraper (S. R. & L. Co.)	\$6.00
Chapin-Stephens Co., Box	30@30&10&10%

Screens, Window and

Maine Screen Frames	40&10&5%
See also Doors.	

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	\$2.50
2 1/2; 1 1/2, \$3.00; 3 1/2; 1 1/4, \$3.50	3.75
Bench Wood	25@25&5%
it, Bias Mfg. Co., Hand	30@30&10%
Chapin-Stephens Co., Hand	25%
Coach, Lag and Hand Rail	
Lag, Cone Point, list Oct. 1	75&15%
Coach, Gimlet Point, list Oct. 1, '99	75&10%
Hand Rail, list Jan. 1, '81	70&10&75%

Jack Screws—

Standard List	75&10&90%
Millers Falls	50&10&10%
Millers Falls, Roller	50&10%
P. S. & W.	50%
Swett Iron Works	75&90%

Machine—

List Jan. 1, '98:	
Flat or Round Head, Iron	50@50&10%
Flat or Round Head, Brass	50@50&10%

Set and Cap—

Set (Iron)	80@80&5%
Set (Steel), net advance over Iron	25%
Sq. Hd. Cap.	75%
Hex. Hd. Cap.	75%
Rd. Hd. Cap.	60&10%
Fillister Hd. Cap.	60&10&10%

Wood—

List July 23, 1903:	
Flat Head, Iron	87 1/2@100%
Round Head, Iron	85 @100%
Flat Head, Brass	82 1/2@100%
Round Head, Brass	80 @100%
Flat Head, Bronze	77 1/2@100%
Round Head, Bronze	75 @100%
Drive Screws	87 1/2@100%

Scroll Saws—

See Saws, Scroll.

Scythes—

Grass, No. 1, Plain	\$6.25@6.75
Clipper, Bronzed Webb	\$6.50@7.00
No. 3 Clipper, Pol'd Webb	\$6.75@7.25
No. 6 Clipper and Solid Steel	\$7.00@7.50
Bush, Weed and Bramble, No. 2	\$8.25@8.75
Grain, No. 1	\$8.50@9.00
Bronzed Webb, No. 1	\$8.50@9.00
Nos. 3 and 4 Clipper, Grain	\$8.75@9.25
Solid Steel, No. 6	\$9.25@9.75

Seeders, Raisin—

Enterprise	25@30%
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Sets—Axl and Tool—

Fray's Adj. Tool Handles, No. 1, \$12;	
2, \$13; 3, \$12; 4, \$9; 5, \$7	50%
C. E. Jennings & Co.'s Model Tool Holders	30%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18	15&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel	\$9 doz sets \$9.00
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Sets, Nail—

Octagon	gro. \$3.50@3.75
Buck Bros.	27 1/2%
Cannon's Diamond Point	gro. \$2.40
Mayhew's	\$1 gro. \$3.00
Snell's Cor'gated, Cup Pt.	gro. \$7.20
Snell's Knurled, Cup Pt.	gro. \$7.20
Springfield Mach. Screw Co.	
Diamond Knurled Cup Pt.	gro. \$7.50

Rivet—

Regular list	75@75&10%
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Saw—

Aiken's:	
Genuine	50&10%
Imitation	50&10%
Atkins:	
Criterion	40%
Adjustable	40%
Bemis & Call Co.'s:	
Cross Cut	30%
Plate	20%
Disston's Star and Monarch	25%
Morrill's No. 1, \$15.00	50%
Nos. 3 and 4, Cross Cut, \$20.00	50%
No. 5, Mill, \$30.00	50%
No. 10, 11, 95, \$15.00	50%
No. 1 Old Style, \$10.00	50%
Special, \$16.25	50%
Giant Royal Cross Cut	gro. \$8.00
Royal, Hand	gro. \$4.50
Taintor Positive	gro. \$6.75

Shaving—

Fox Shaving Sets, No. 30	gro. doz. net, \$24.00
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Sharpeners, Knife—

Chicago Wheel & Mfg. Co.	70%
Mfg. Co.	
Fast Cut Pocket Knife Hones	\$1.50
Mounted Kitchen Sand Stone	\$1.50
Quick Cut Emery Carbine	\$3.00
Knife Hones, 1/2 doz.	\$1.50
Quick Edge Pocket Knife Hones, 1/2 doz.	\$2.00

Skate—

Smith & Hemenway Co.	20%
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Shaves, Spoke—

Iron	doz. \$1.10@1.25
Wood	doz. \$1.75@2.25
Razor Edge (Stanley R. & L. Co.)	35%
Chapin-Stephens Co.	30@30&10&10%
Goodell's	doz. \$9.00
Wood's F1 and F2	50%

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.
Straight Trimmers, &c.:	
Best quality Jap.	70@70&10%
Best quality, Nickel	60@60&10%
Fair quality, Jap.	80@80&5%
Fair quality, Nickel	75@75&10%
Tailors' Shears	40@40&10%
Acme Cast Shears	40@40&5%
Heinisch's Tailors' Shears	10
Wilkinson's Sheep 1900 list	30&10&5%
Grass, 50&10%; Horse or Mule, 50&10%	

Tinners' Snips—

Steel Blades	80&5@20&10%
Steel Laid Blades	40&10&150%
Forged Handles, Steel Blades, Berlin	50@50&5%
Heinisch's Snips	40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to 10 in.	50%
Niagara Snips	40%
P. S. & W. Forged Handles	20%

Pruning Shears—

Cronk's Hand Shears	33 1/2%
Cronk's Wood Handle Shears	33 1/2%
Disston's Combined Pruning Hook and Saw, 9 doz.	\$18.00
Disston's Pruning Hook, 1/2 doz.	\$12.00
John T. Henry Mfg. Co.:	
Pruning Shears, all grades	50&10%
P. S. & W. Forged Handles	33 1/2%
Wilkinson's Hedge, Wilcut Brand	60&10%

Sheaves—Sliding Door—

Stowell's Anti-Friction	50%
Reading	40%
It. & E. list	35%
Wrightsville Hatfield Pattern	80%

Sliding Shutter—

Reading list	40%
It. & E. list	33 1/2%

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, Club, Rival, 10 and 12 gauge	65&5%
Paper Shells, Empty:	
Acme, Ideal, Leader, New Rapid, 10, 12, 16 and 20 gauge	25&5%
Blue Bird, 20 gauge	20%
Monarch, Deafener, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge	20%
Climax, Union, League, New Rival, 10 and 12 gauge	25%
Climax, Union, League, New Rival, 14 and 16 gauge	20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge	33 1/2%
Robin Hood, Low Brass	20&5%
Robin Hood, High Brass	30&5%

Shells, Loaded—

Loaded with Black Powder	40%
Loaded with Smokeless Powder, medium grade	40&5%
Loaded with Smokeless Powder, high grade	40&10&10%
Robin Hood Smokeless Powder:	
Robin Hood, Low Brass	50%
Comets, High Brass	50&10&5%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:	
Iron	per keg \$4.00
Steel	per keg \$3.75
Burden's, all sizes	per keg \$3.90

Shot—

Drop, up to B, 25-lb. bag	\$1.85
Drop, B and larger	
Buck, 25-lb. bag	\$2.10
Chilled, 25-lb. bag	\$2.10
Dust, 25-lb. bag	\$2.30

Shovels and Spades—

Association List, Nov. 15, 1902	40%
Snow Shovels—	
Long Handle	\$2.75@3.00
Wood and Mail, D. Handle	\$3.25@3.50

Sieves and Sifters—

Hunter's Imitation	gro. \$9.50@10.00
Hunter's Genuine	per gro. \$12.00@12.50
Buffalo Metallic Blue, R. M. Co., 1/2 gr.	14&16 16&18 18&20
\$13.20 \$13.50 \$14.40	

Sieves, Seamless Metallic—

Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch	
Mesh 18, Nested	doz. \$0.90@0.95
Mesh 20, Nested	doz. \$1.00@1.05
Mesh 24, Nested	doz. \$1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 18 to 22 x 36 in.	60&5%
20 x 40 to 24 x 50 in.	55%
24 x 60 to 24 x 120 in.	35%
Barnes' low list:	
Up to and including 20 x 36 in.	60%
20 x 40 to 24 x 50 in.	55%

NOTE.—There is not entire uniformity in lists used by jobbers.

Skins, Wagon—

Cast Iron	70@75&10%
Steel	40@45%

Slates, School—

Factory Shipments.

"D" Slates	50@50&10%
Eureka, Uncerced Noiseless	60&5 tens

Saw Cutters—See Cutters.

Snaps, Harness—

German	40@40&10%
Covert Mfg. Co.:	
Derby, 30&2; Yankee, 30&2; Yan-	
kee Roller, 30&2;	
High Grade, 45%; Trojan	45%

Hindustan No. 1, B'g'lar, 10 doz. \$1.00
Hindustan No. 1, Small, 10 doz. \$1.00
Are Stones (all kinds) 10 doz. \$1.00
Turkey Oil Stones, Extra, 10 doz. \$1.00
Queer Creek Stones, 4 to 8 in., 10 doz. \$1.00
Queer Creek Slips, 10 doz. \$1.00
Sand Stone, 10 doz. \$1.00

Scythe Stones—
Gem Corundum 10 in., \$5.00
gro., 12 in., \$10.00

Norton Emery Scythe Stones:
Less than gross lots, \$9.00
One gross or more, \$7.20
Lots of 10 gross or more, \$6.00

Pike Mfg. Co., 1901 list:
Black Diamond S. B., 10 doz. \$12.00
Lamotte S. B., 10 doz. \$11.00
White Mountain S. B., 10 doz. \$9.00
Green Mountain S. B., 10 doz. \$8.00
Extra Indian Pond S. B., 10 doz. \$7.50
No. 1 Indian Pond S. B., 10 doz. \$7.00
No. 2 Indian Pond S. B., 10 doz. \$6.50
Leader Red End S. B., 10 doz. \$6.00
Quick Cut Emery, 10 doz. \$10.00
Pure Corundum, 10 doz. \$18.00
Crescent, 10 doz. \$7.00
Emery Scythe Rifles, 2 Coats, 10 doz. \$5.00
Emery Scythe Rifles, 3 Coats, 10 doz. \$6.00
Emery Scythe Rifles, 4 Coats, 10 doz. \$7.00
Balance of 1904 list 33%

Stoppers, Bottle—
Victor Bottle Stoppers, 10 doz. \$9.00

Stops—Bench—
Miller's Falls, 15 doz. \$10.00
Morrill's, No. 1, 10 doz. \$10.00
Morrill's, No. 2, 10 doz. \$12.50

Door—
Chapin-Stephens Co., 60 doz. \$10.00

Plane—
Chapin-Stephens Co., 20 doz. \$2.00

Straps—Box—
Cary's Universal, case lots, 25 doz. \$2.00

Stretchers, Carpet—
Cast Iron, Steel Points, doz. \$1.00

Socket—
Bullard, 10 doz. \$1.00
Excelsior Stretcher and Tack Hammer Combined, 10 doz. \$6.00

Strops, Razor—
Star Diagonal Strop, 25 doz. \$2.00

Stuffers, Sausage—
Enterprise Mfg. Co., 25 doz. \$7.50
National Specialty Co., list Jan. 1, 1902, 30 doz. \$3.00

Sweepers, Carpet—
National Sweeper Co., 10 doz. \$1.00

Plated—
Louis XV, Roller Bearing, Gold Plated, 10 doz. \$12.00

Hepplewhite, Roller Bearing, Silver Plated—
Sheraton, Roller Bearing, N'kel, 10 doz. \$12.00

Ye Mission, Roller Bearing, Oxidized Copper—
Transparent, Roller Bearing, Plate Glass top, Nickel, 10 doz. \$3.00

National Queen, Roller Bearing, Fancy Veneers—
Loyal, Roller Bearing, Veneers, Nickel, 10 doz. \$2.00

Triple Med, Roller Bearing, Nickel—
Marion, Roller Bearing, N'kel, 10 doz. \$2.00

Marion Queen, Roller Bearing, Nickel—
Monarch, Roller Bearing, N'kel, 10 doz. \$2.00

Monarch, Roller Bearing, N'kel—
Perpetual, Regular B'g'lar, N'kel, 10 doz. \$2.00

Monarch Extra (17 in. case), Roller Bearing, Nickel—
Monarch Extra (17 in. case), Roller Bearing, Japanned, 10 doz. \$3.00

Auditorium (25 in. case), Roller Bearing, Nickel—
Mammoth (30 in. case), Roller Bearing, Nickel, 10 doz. \$6.00

NOTE—Rebates: 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.: Model E, Sanitaire, 10 doz. \$25.00

Model A, Sterling, 10 doz. \$25.00

Model B, Sterling, Nickel, 10 doz. \$25.00

Model B, Sterling, Japanned, 10 doz. \$21.00

Model C, Sterling, 10 doz. \$21.00

Model D, Sterling, 10 doz. \$19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks—
American Cut Tacks, 10 doz. \$1.00

Suedes Cut Tacks, 10 doz. \$1.00

Suedes Upholsterers', 10 doz. \$1.00

Gimp Tacks, 10 doz. \$1.00

Lace Tacks, 10 doz. \$1.00

Trimmers' Tacks, 10 doz. \$1.00

Looking Glass Tacks, 10 doz. \$1.00

Bill Posters' and Railroad Tacks, 10 doz. \$1.00

Hungarian Nails, 10 doz. \$1.00

Finishing Nails, 10 doz. \$1.00

Trunk and Clout Nails, 10 doz. \$1.00

NOTE—The above prices are for Standard Weights. An extra 5% is given on Medium Weights and an extra 10% is given on light weights.

Miscellaneous—
Double Pointed Tacks, 10 doz. \$1.00

See also Nails, Wire.

Tanks, Oil—
Emerald, R. M. Co., 20 gal. \$3.40

Emerald, R. M. Co., 50 gal. \$4.25

Queen City, R. M. Co., 20 gal. \$3.65

Queen City, R. M. Co., 50 gal. \$4.50

Tapes, Measuring—
American Asaes' Skin, 50 ft. \$1.00

Patent Leather, 25 ft. \$0.45

Steel, 33 ft. \$1.45

Chesterman's, 35 ft. \$2.45

Keuffel & Esser Co.: Favorite, Ass Skin, 40 doz. \$10.00

Favorite, Duck and Leather, 25 doz. \$5.00

Metallic and Steel, lower list, 35 doz. \$5.00

Lufkin's: Asses' Skin, 40 doz. \$10.00

Metallic, 35 doz. \$5.00

Patent Bend, Leather, 25 doz. \$5.00

Pocket, 40 doz. \$10.00

Steel, 35 doz. \$5.00

Teeth, Harrow—
Steel Harrow Teeth, plain or headed, 1/2-inch and larger, per 100 lbs. \$2.75 to \$3.00

Thermometers—
Tin Case, 80 doz. \$10.00 to \$10.45

Ties, Bale—Steel Wire—
Single Loop, 80 doz. \$10.45

Monitor, Cross Head, &c., 70 doz. \$10.45

Brick Ties—
Niagara Brick Ties, 25 doz. \$10.45

Tinners' Shears, &c.—
See Shears, Tinners', &c.

Tinware—
Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.
See Benders and Upsetters, Tire.

Tools—Coopers'—
L. & I. J. White, 20 doz. \$20.45

Hay—
Myers' Hay Tools, 50 doz. \$5.00

Stowell's Hay Carriers, 50 doz. \$5.00

Forks, 50 doz. Fork Pulleys, 50 doz.

Miniature—
Smith & Hemenway Co., 25 doz. \$5.00

Saw—
Atkins' Cross Cut Saw Tools, 40 doz. \$4.00

Simonds' Improved, 35 doz. \$3.50

Simonds' Crescent, 25 doz. \$2.50

Ship—
L. & I. J. White, 25 doz. \$25.00

Transom Lifters—
See Lifters, Transom.

Traps—Fly—
Balloon, Globe or Acme, doz. \$1.15 to \$1.25

Harper, Champion or Paragon, doz. \$1.25 to \$1.40

Game—
Imitation Oneida, 75 doz. \$7.50 to \$7.65

Newhouse, 45 doz. \$4.50 to \$4.65

Hawley & Norton, 10 doz. \$10.00

Oneida Community Jump, 50 doz. \$5.00

Mouse and Rat—
Mouse, Wood, Choker, doz. holes 8 1/2 doz. \$9.00

Mouse, Round or Square Wire, doz. 85 doz. \$9.00

Marty French Rat and Mouse Traps (Genuine): No. 1, Rat, each \$1.21; 10 doz. \$13.25

No. 3, Rat, each \$1.50; case of 50, \$75.00

No. 3 1/2, Rat, 10 doz. \$5.25; case of 72, \$37.50

No. 4, Mouse, 10 doz. \$3.85; case of 150, \$57.75

No. 5, Mouse, 10 doz. \$3.00; case of 150, \$45.00

Trimmers, Spoke, 25 doz. \$2.50

Wood's E 1, 50 doz. \$5.00

Trowels—
Diston Brick and Pointing, 30 doz. \$3.00

Diston Plastering, 25 doz. \$2.50

Diston "Standard Brand" and Garden Trowels, 35 doz. \$3.50

Kohler's Steel Garden Trowels, 10 doz. \$10.00

5 in. \$4.50; 6 in. \$6.00

Never-Break Steel Garden Trowels, 10 doz. \$10.00

Rose Brick and Plastering, 25 doz. \$2.50

Woodruff & McParlin, Plastering, 25 doz. \$2.50

Trucks, Warehouse, &c.—
B. & L. Block Co.: New York Pattern, 50 doz. \$5.00 to \$5.10

Western Pattern, 50 doz. \$5.00 to \$5.10

Handy Trucks, 10 doz. \$18.00

Grocery, 10 doz. \$15.00

Daisy Stove Trucks, Improved Pattern, 10 doz. \$18.50

McKinney Trucks, each \$10.00

Model Stove Trucks, 10 doz. \$18.50

Tubs, Wash—No. 1 5 3

Galvanized, per doz. \$4.25 4.75 5.25

Galvanized Wash Tubs (R. M. Co.): No. 1 2 3 10 20 30

Per doz., net \$5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—
Flax Twine: B. C. B.

No. 9, 1/4 and 1/2 lb. Balls, 22 doz. \$2.40

No. 12, 1/4 and 1/2 lb. Balls, 18 doz. \$2.00

No. 18, 1/4 and 1/2 lb. Balls, 16 doz. \$1.80

No. 24, 1/4 and 1/2 lb. Balls, 16 doz. \$1.80

No. 36, 1/4 and 1/2 lb. Balls, 15 doz. \$1.70

Chalk Line, Cotton 1/4 lb. Balls, 25 doz. \$3.00

Cotton Mops, 6, 9, 12 and 15 lb. to doz. \$10.18 to \$10.45

Cotton Wrapping, 5 Balls to lb., according to quality, 15 doz. \$2.00

American 2-Ply Hemp, 1/4 and 1/2 lb. Balls, 15 doz. \$1.45

American 3-Ply Hemp, 1 lb. Balls, 15 doz. \$1.45

India 2-Ply Hemp, 1/4 and 1/2 lb. Balls (Spring Twine), 9 doz. \$1.90

India 3-Ply Hemp, 1 lb. Balls, 9 doz. \$1.90

India 3-Ply Hemp, 1 1/2 lb. Balls, 7 1/2 doz. \$1.90

2, 3, 4 and 5-Ply Jute, 1/2 lb. Balls, 9 1/2 doz. \$1.90

Mason Line, Linen, 1/4 lb. Balls, 16 doz. \$1.80

No. 25, Mattress, 1/4 and 1/2 lb. Balls, 37 doz. \$3.70

Wool, 3 to 6 ply, 1/2 lb. Balls, 7 1/2 doz. \$7.40

Vises—
Solid Box, 60 doz. \$6.00

Parallel—

Athol Machine Co.: Simpson's Adjustable, 40 doz. \$4.00

Standard, 40 doz. \$4.00

Amateur, 40 doz. \$4.00

Columbian Hdw. Co., 40 doz. \$4.00

Emmert Universal: Pattern Makers' No. 1, 15 doz. No. 2, 12 doz.

Machinist and Tool Makers' No. 1A, 12 doz. No. 5A, 7 doz. No. 6A, 10 doz. No. 10A, 22 doz.

Presto Quick Acting, 25 doz. \$25.45

Tiger Machinists, 40 doz. \$4.00

Fisher & Norris Double Screw, 15 doz. \$15.00

Holland's: Machinists, 40 doz. \$4.00 to \$4.50

Keystone, 65 doz. \$6.50 to \$7.00

Lewis Tool Co.: Adjustable Jaw, 30 doz. \$3.00

Monarch, 50 doz. Solid Jaw, 50 doz. Massey Vise Co.: Clincher, 40 doz. \$4.00

Perfect, 20 doz. Lightning Grip, 20 doz. Millers' Falls, 60 doz. \$6.00

Parker's: Victor, 20 doz. \$2.00 to \$2.25

Vulcan's, 40 doz. \$4.00 to \$4.50

Combination Pipe, 55 doz. \$5.50

Prentiss, 20 doz. \$2.00 to \$2.25

Snediker's X. L., 35 doz. \$3.50

Stephens, 35 doz. \$3.50

Saw Filers—
Diston's D 3 Clamp and Guide, 10 doz. \$3.00

Perfection Saw Clamps, 10 doz. \$4.50

Reading, 60 doz. \$6.00

Wentworth's Rubber Jaw, Nos. 1, 2 and 3, 45 doz. \$4.50 to \$5.00

Wood Workers—
Massey Vise Co.: Lightning Grip, 15 doz. \$1.50

Wymann & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe Vise, 60 doz. \$6.00 to \$6.50

Holland's Combination Pipe, 60 doz. \$6.00 to \$6.50

Massey's Quick Action Pipe, 40 doz. \$4.00

Parker's Combination Pipe: 87 Series, 60 doz. 187 Series, 60 doz. \$5.00, 40 doz.

Wads—Price per M.

B. E., 11 up, 60 doz. \$6.00

B. E., 9 and 10, 70 doz. \$7.00

B. E., 8, 80 doz. \$8.00

B. E., 7, 80 doz. \$8.00

P. E., 11 up, 100 doz. \$1.00

P. E., 9 and 10, 1.25

P. E., 8, 1.50

P. E., 7, 1.50

Ely's P. E., 11 and larger, \$1.70 to \$1.75

Ely's P. E., 12 to 20, \$3.00 to \$3.25

Ware, Hollow—
Cast Iron, Hollow—

Stove Hollow Ware:

Enameled, 55 doz. \$5.50

Ground, 60 doz. \$6.00

Plain or Unground, 65 doz. \$6.50

Country Hollow Ware, per 100 lbs., 22.75

White Enameled Ware:

Maslin Kettles, 70 doz. \$7.00

Covered Ware:

Tinned and Turned, 40 doz. \$4.00

Enameled, 50 doz. \$5.00

See also Pots, Glue.

Enameled—
Agate Nickel Steel Ware, 60 doz. \$6.